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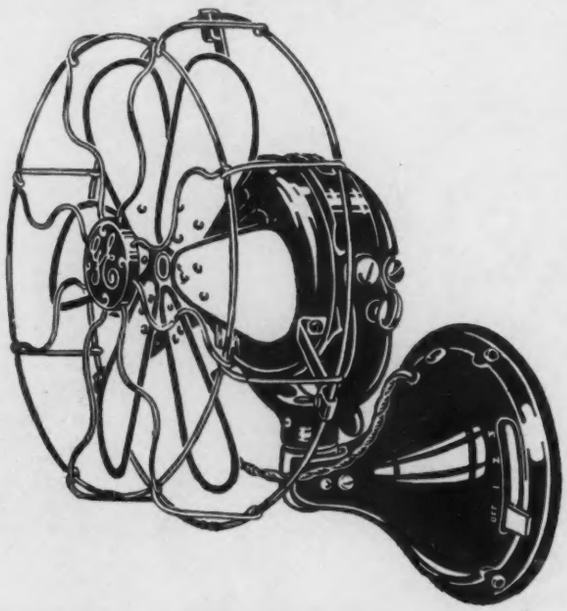

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A LOG OF THE "JUPITER'S" TRIAL TRIP

BY H. A. RUSSELL

The first trial trip of the U. S. Collier "Jupiter" was started on November 14th, a Friday. The weather was propitious and great was the disappointment when soon after starting something went wrong with the turbine. A tap bolt had broken off in the first stage of the turbine making a rattling noise and inspection showed that the first stage buckets had become badly bent. These buckets could have been straightened with very little trouble after the bolt was removed but it was decided to put in a new set of buckets before attempting the official trial. The buckets were accordingly made at the factory and afterwards put in place while the vessel was lying at Mare Island.

The second official trip was started on Saturday, February 14th, escaping both Friday and the 13th this time, and after the heavy storms that had prevailed it seemed as though all concerned would be amply repaid for their enforced waiting.

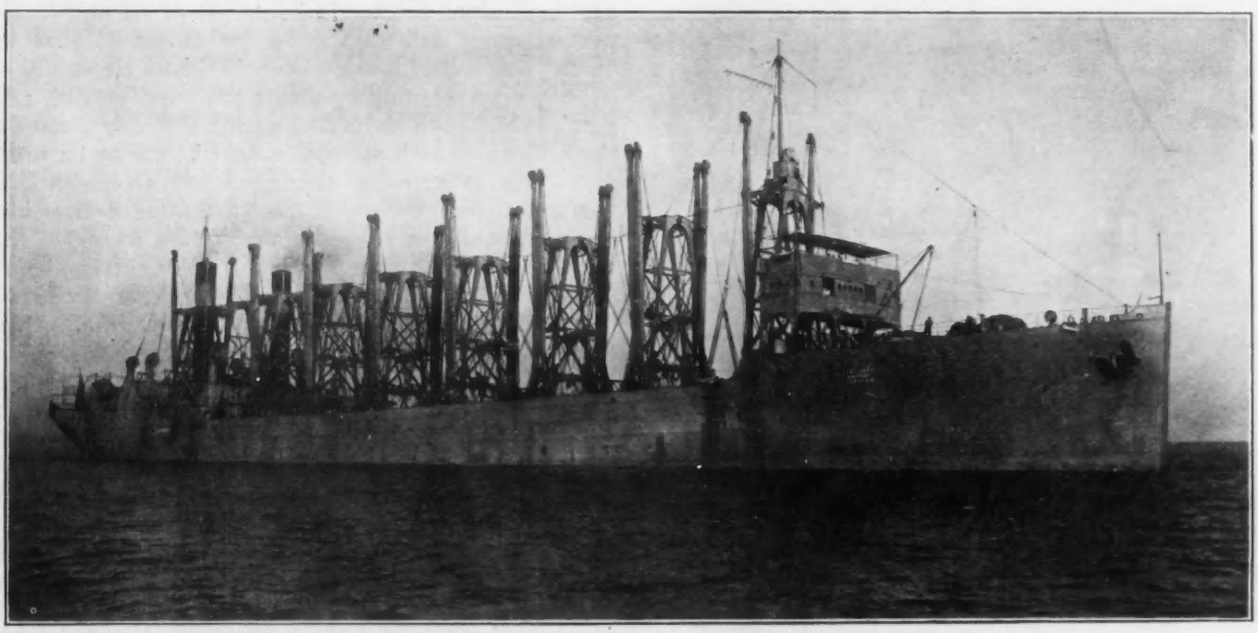
The "Jupiter" is a twin screw ship of the single deck type, designed for a speed of 14 knots, and developing 5500 shaft horsepower.

The principal dimensions are:

Length over all	542 ft. 2½ in.
Extreme beam	65 ft. 2 13/16 in.
Mean draught	27 ft. 6 in.
Displacement	19,230 tons.

The cargo capacity is 966,265 gal. of oil and 9856 tons of coal, or 405,617 gal. of oil and 11,377 tons of coal, this making her burden about 12,000 tons.

The propelling machinery consists of one turbo-generator and two induction motors direct connected to the shaft of each propeller. The normal rating is as follows:



Electrically Propelled Collier U. S. S. "Jupiter."

Generator—		Motor—	
Kilowatts	5450	Number of poles	36
Number of poles	2	Horsepower	2750
Number of volts	2300	Volts	2300
Revolutions	1990	Revolutions	110
Excitation in amperes	250		

The motors are coil wound, having collector rings for introducing resistance into the rotor winding.

A set running speed is maintained through the turbine by fixing the governor for any predetermined speed. For manoeuvering or coming to a dock this speed may again be varied by varying the resistance

in the rotors of the motors. The weight of the electrical machinery, including turbo-generator, motors, exciters and switchboard, is 156 tons.

The "Jupiter" cost a little over a million and a quarter dollars. The ship is under the Navy and has a complement of 11 officers and 148 men.

The present officers are:

J. M. Reeves, Commander, a genial host and an officer of whom our Navy may well be proud.

S. M. Robinson, Chief Engineer and Executive Officer Lt., who has made a study of turbine drive.

Wm. P. Gaddis, Navigation Officer, who can put a pencil on a chart at any time of the day or night which would locate the ship's position.

L. S. Whiteside, Surgeon, always looking out for the health of the crew but not overburdened on this trip.

J. A. Harmon, Paymaster, who looked after the mess and was a busier man than the doctor.

N. L. Kirk, M. Hodson, F. Hindrelet, Ensigns, who stood watch.

E. L. Kempton, Chief carpenter.

R. L. Scott, Chief machinist.

W. T. Shaw, Boatswain.

Com. J. M. Reeves

Left to right: Chf. Eng. S. M. Robinson. W. L. Emmet. Lieut.Com. G.S. Lincoln.

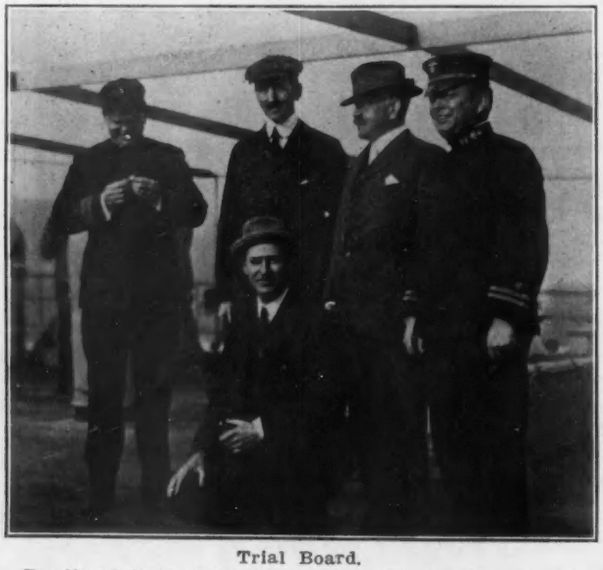
Chf. Mchst. R. L. Scott

The Chief of the Trial Board was Captain C. A. Grove of Yerba Buena, and with him were Commander J. R. Brady, Bremerton; Lt. Commander L. S. Shapley, Mare Island; Lt. W. A. Smead, Mare Island; Naval Constructor R. B. Hilliard of Vicksburg.

Representatives of the Mare Island Navy Yard were: Naval Constructor H. M. Gleason; Lt. R. L. Stover; and Assistant H. O. Shuster.

Also assisting on the Trial Board were: Lt. J. J. Manning; Lt. R. T. Kieren; Ensign J. D. Moore; Chief Machinists C. M. Huber and A. Peterson.

The Navy Department invited a limited number of guests who were interested in the operation of the boat, consisting of W. H. Bailey, W. J. Davis Jr., F. E. Vickers, H. A. Russell of the General Electric Company; H. B. Truett, Kern Trading & Oil Company; C. V. Lane, Union Iron Works; J. N. Densham, H. Forsland, R. W. Walker, representatives of the press; R. B. Beal, of the Federal Telegraph Company; A. H. Babcock and F. G. Geibel, of the Southern Pacific Company; J. F. Donahue, of the Meade Morrison Mfg. Company, who installed the coal handling gear; J. P. Van Leer, of the Standard Oil Company.



Trial Board.

Reading left to right: Lieut. Com. L. S. Shapley; Com. J. R. Brady; Capt. C. A. Grove; Lieut. W. A. Smead; and (seated) Navy Const. R. B. Hilliard.

We cast off from the Coaling Station at California City at 12:00 o'clock and with a smooth sea and light easterly breeze passed the Lightship at 2:20. The official run of 48 hr. at full speed was commenced at 3:00 o'clock, taking a southwesterly course for about 350 miles to sea.

The ship's performance was determined from many angles and all observations checked against each other. All the coal was weighed. All the water returned from the condenser was weighed and measured in tanks before being pumped back into the boilers for feed water. All electrical output was measured by instruments on the switchboard. Revolutions of the generator and motors, which are direct connected to the propellers, were taken by electrical and mechanical speed counters. The actual horsepower given to propellers was measured on the shaft by torsion meters. All readings were taken and recorded hourly and more often where deemed necessary.

After our course had been set the handling of the boat became mere routine and there was nothing left to do except to take readings and await results.

The boat was designed for a propeller speed of 110 revolutions to give 14 knots per hr. From former performances and ship tests we estimated that the 48 hr. run would show about 15 knots, it would all depend upon keeping up steam pressure, barring accidents which nobody anticipated. All day Saturday there was a smooth sea with a light breeze and a sunny sky. Sunday morning opened cloudy and with light rain and little prospect of the Navigating Officer having a sight of the sun. In fact, cigars were bet that we would not be able to take an observation before noon, but Mr. Gaddis won handily, and the day turned out bright and sunny enough to so entitle him to three cigars. At 1:45 p. m. Sunday, the 15th, we reached our most westerly point, some 300 miles to sea, and put about setting our course for Point Conception, or a little north of it. Monday morning about 10:00 o'clock land was sighted which proved to be Point Arguello. We were about 70 miles off at the time and being an overcast day and, probably, as we thought foggy about the coast, a remarkable pick up. At 2:40 in the afternoon we came abreast of Point Conception, changing our course in the Santa Barbara channel, which we kept until the completion of our 48 hr. run which ended at 3:00 o'clock. We then steamed to anchoring ground off Santa Barbara where we lay for the night.

Tuesday, the 17th, was devoted to standardizing. This consists of running over a standard mile which is measured by ranges on the beach and noting the data attending each run. Five of these runs were made, three in one direction and two in the opposite to determine data at full speed which proved to be about 15 knots per hr. Three mile runs were made to determine data at 14, 12, 10 and 8 knots, respectively, making seventeen trips over the course in all.

After this the turning test was made. When going at full speed a float was put overboard and at the same time the wheel put hard over. When a circumference of 180 degrees had been described a second float was put over and the course of the two floats observed. The ship was then brought past the two floats at full speed and the time noted which enabled the observers to calculate the distance between the two floats or the turning diameter. The boat took two minutes to complete 180 degrees and the turning diameter was about 800 yds. The data given by this test proved the ship better in manœuvering than some of the officers had expected. The 48 hr. run had been completed at full speed and the total consumption of fuel and water noted.

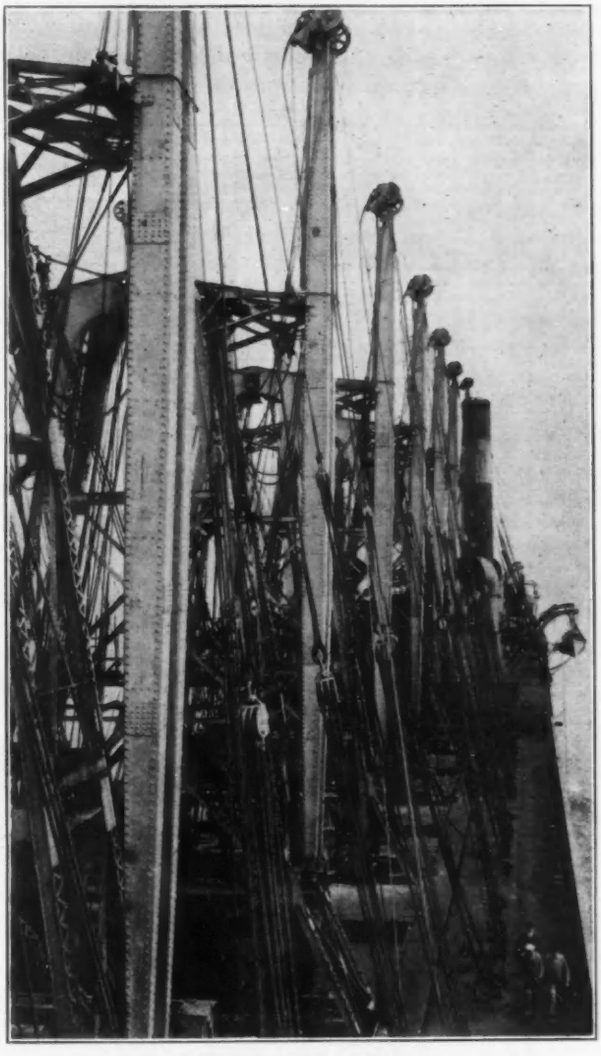
While anchored at Santa Barbara a four hour run was made to determine the steam consumption of all auxiliaries. This run was made under conditions identical to those in the 48 hr. run. Deducting the steam taken by auxiliaries from the total steam gave us the steam consumed by the turbine. The standardizing runs have now been made giving the speeds attained under different revolutions of the propellers.

One more test remains and that is the endurance test of 24 hr. at a 10 knot speed. This test was started Tuesday night at 8:15. At this time our course was again set to sea to avoid coastwise vessels and possible fogs, it also being desirable not to approach too near the coast before daylight. Tuesday night and throughout Wednesday was cloudy and threatening, thunder storms off the coast could be noticed by distant lightning flashes. Wednesday night we experienced a southeaster, probably the tail of the storm that did so much damage to the railroads and highways in southern California. Our cots were made down in the ward room and, while the chairs were lashed to tables and posts, the cots were free to visit where they listed and when the ship listed, which was often. It was reported that the vessel rolled nearly 30 degrees on both sides and this does not seem unreasonable when one stops to consider the weight of superstructure in the coal handling gear. Looking at it from the bridge it looks like a forest of steel booms. Our 24 hr. run finished at 8:15, 100 miles south of the Farallones.

At 8:15 Thursday morning we dropped anchor off California City after which another four hour run to determine the water rate of auxiliaries completed the 24 hr. or 10 knot test. This completed the test with the exception of the coal handling gear which was made while at anchor off California City.

It may be interesting to note how the manufacturer's expectations have been realized and to make a comparison between the operation of a boat of this character and one equipped with the well known type of reciprocating engine. One important point is the accurate data which was obtained and which cannot be had with the ordinary engine. The amount of electrical power being developed may be read by the electrical instruments at any instant. The losses of the generator and the motors are definitely known from shop tests so that we know the exact amount of power going into the propelling shafts. The total electric losses are 8 per cent, being about 3 per cent in the generator and 5 per cent in the motors. This again is checked by the torsion meter and all of these results checked within practical limits.

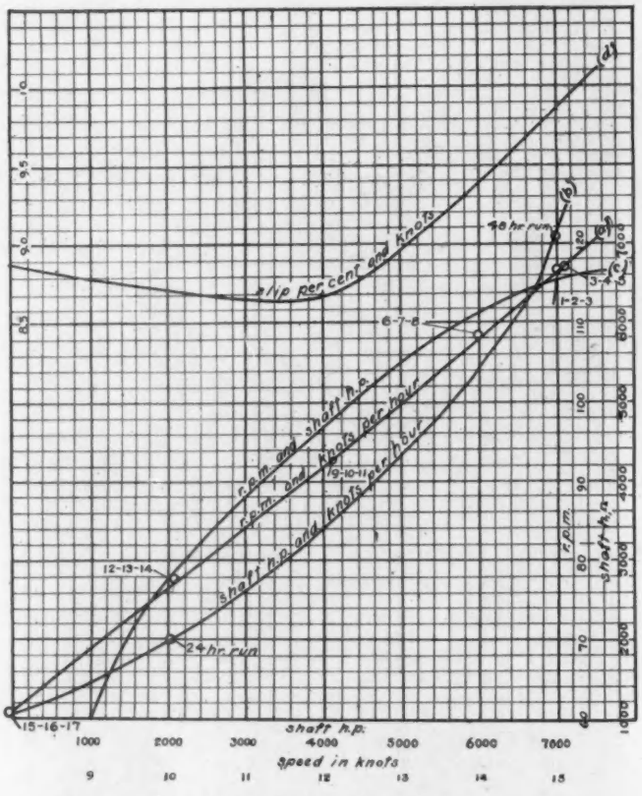
Preliminary tests were made before the accident to the turbine which occurred in November, and after putting in a new row of buckets the first tests were verified, showing that the results in the turbine are



A Forest of Steel Booms.

not obtained by any haphazard methods. The manufacturer designed the turbine to give an expected water rate of 11.2 lb. per shaft h.p. This result was obtained in shop tests after the turbine was built. This water rate was calculated under dry steam at 190 lb. pressure at the throttle and 28½ in. vacuum. While these exact conditions could not be met on the 48 hr. run corrections to allow for different conditions would bring the water rate to the manufacturer's original estimate within a very close margin. The manufacturer's guarantee was 13 lb. of water per indicated horsepower at full speed, or at 14 knots. It will be seen that expectations were more than realized both in water rate and speed. There is no doubt that with oil burning boilers better results would have been obtained. The real hard work was done in the fire room to keep up steam, while with oil the pressure could have been maintained at a given point about as easily as we set the turbine governor for a given speed. The revolutions of the propeller necessary to attain

the different speeds show a very efficient propeller. This may be due entirely to the design of the propeller or, as has been suggested, it may be that the uniform rotation of the propellers allows them to work up to a higher efficiency. One thing, however, worthy of notice is that with a motor drive we can choose the most efficient speed of propeller and then build the motors to suit. The sister ships to the "Jupiter" are the "Cyclops" and "Neptune," the former propeller speed being 88 revolutions and the latter 135. The

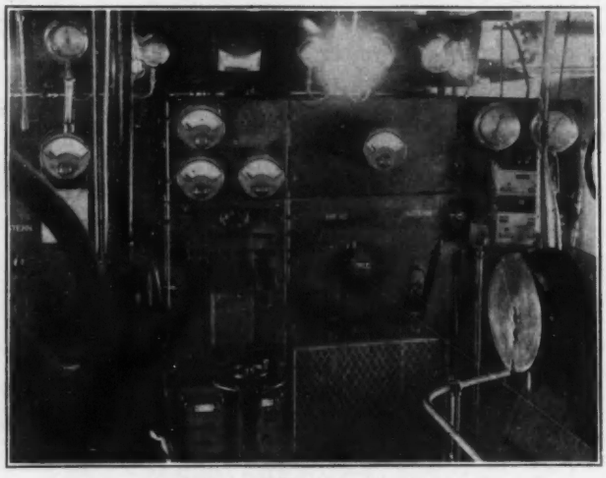


Curve "a" which is nearly a straight line, is an important one for operating the ship. The Navigator calls for 10, 12 or 14 knots per hr., and from this curve the engineer can set the governor for the number of revolutions to give the required speed.

Curves "b" and "c" give the horsepower under different speed from which the water rate can be calculated.

Curve "e" shows the slip of the propeller which does not show great change of efficiency at the different speeds. The most efficient point of propeller is 11.6 knots, the slip being 8.66 per cent. At 10 knots and 14 knots it is respectively 8.73 and 9.4 per cent, the difference being a little over one-half of one per cent.

Jupiter's propeller speed is 110, which from the results obtained would make it appear to be better design. The "Cyclops" and "Neptune" propeller speeds are the speeds best suited to their prime mover but in a motor drive the speed is immaterial so long as it is right for the propeller. At all events, the speed is under control at all times, an important item in a battle ship where speed regulation is relied upon to keep formation. The turbine maintains uniform speed, and likewise the motors, no matter whether the propellers are submerged or partly out of water. The governor may be set for any predetermined speed by the turn of a handwheel. The man on the bridge calls for 8, 10 or 15 knots, the governor is set for this speed and nothing more is to be done, and the speed called for is maintained until another speed is wanted. There is no disagreeable vibration from the propeller and while the ship the last day out was rolling its heaviest and cots were sliding about the ward room one could not tell that the ship was under way from its motion. The only evidence of moving machinery was the throbbing of the dry air pump which we might call the lungs of the system. This reciprocating machine could well be replaced with a rotary one which would still allow the ship to breathe without snoring.

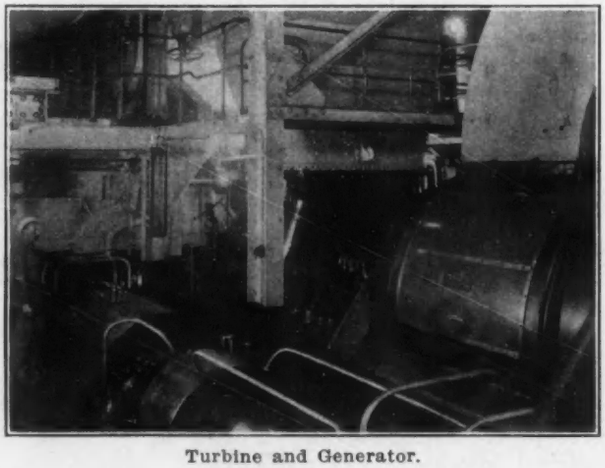


Switchboard U. S. S. "Jupiter."

On an official trial everything is keyed up and nursed to get the most favorable results. Here the engine room routine was carried on as on an ordinary cruise except for the frequent readings of instruments. No bearings were opened or the many guides, valves and pins nursed along as in other trial trips—for there were none. When the ship was tied up at California City there were no repairs to be made and she could have turned around for a long sea voyage the next day if necessary.

The turbine on land has come to stay and its advantages are equally important, or more so, and quite as available at sea.

The principle of the turbine is not new and what has held back its development the most has been the



Turbine and Generator.

lack of a suitable application of its high speed until the advent of the dynamo. It has been asked why ship owners have not already taken advantage of the economy and reliability possessed by the turbine. It is because a suitable means of speed reduction has not

been thought out until quite recently. The turbine builders have been too busy ashore to go to sea. A high speed turbine can be hitched up to the low speed propeller by means of motors or by gearing designed for the purpose. Different conditions may make one or the other desirable but the turbine is back of either of them.

The results obtained in the trial are as follows:

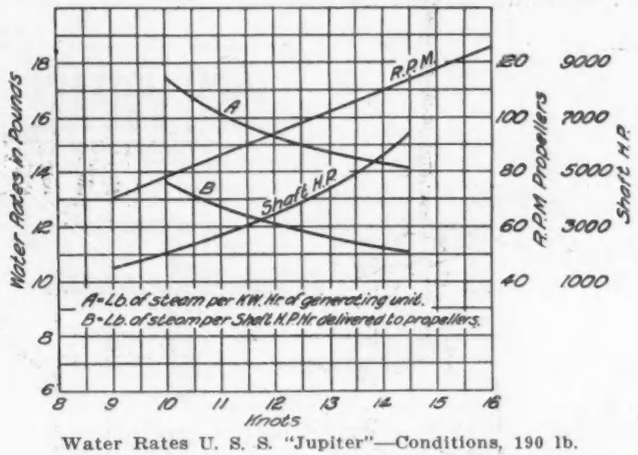
48 Hr. Run—Maximum Attainable Speed.

	Trial Runs.	Contract Guarantees.
Average sustained speed, knots per hr.	14,996	14
Shaft h.p.	7,152	5,500
Shaft r.p.m.	116.7	110
Lb. steam per shaft h.p.	11.69	13
Lb. coal per shaft h.p.	1.662	..

24 Hr. Run—10 Knots per Hr.

	Trial Runs.	Contract Guarantees.
Lb. Steam per shaft h.p.	12.31	15
Shaft h.p.	2,157	..
Shaft r.p.m.	76.8	..
Lb. coal per shaft h.p.	2,505	..
Steam pressure, pounds	165	190
Vacuum, 30-in. bar	28.5	28.5
Moisture in steam (per cent)	1½	Dry

It will be seen that conditions during the trials were not up to standard named in manufacturer's contract, the steam pressure at the turbine throttle being 165 as against 190 lb. Also there was about 1½ per cent moisture in the steam which should have been delivered dry to the turbine. Correcting the water



Water Rates U. S. S. "Jupiter"—Conditions, 190 lb. Gauge, 28.5 in. Vacuum, No Superheat.

rate by 3 per cent to allow for 1½ per cent moisture and 2½ per cent for the difference of 25 lb. steam, brings the water rate during the 48 hr. run at maximum speed down to 11.04 lb. which agrees very closely with the factory test of 11.2. Similarly, the water rate for the 24 hr. run at 10 knots should be corrected to 11.63, which also agrees very closely with the factory test. The drop in steam pressure is due to the 8 in. steam pipe between boilers and turbine—this is being replaced by 12 in. pipe which will show a marked improvement in results. The curve herewith shows the revolutions and horsepower developed at different speeds.

Considering these results with the data thus far obtained from the "Cyclops," the "Jupiter's" economy is 20 per cent better with a weight of 156 as against 280 tons. The weight and economy are a marked advantage in a marine installation that counts for a good deal more than it would on land. As the turbine has replaced the engine on land there are more potent reasons why it should do the same thing at sea.

LEGAL REQUIREMENTS FOR OVERHEAD CONSTRUCTION IN CALIFORNIA.

BY J. E. MACDONALD.

These notes and diagrams were prepared, primarily, for guidance of those in charge of various distribution systems in Southern California. Chapter 499, Statutes of California, 1911, of itself supplies sufficient verbosity to preclude any lengthy apology for presenting them for publication in an attempt to assist others in "upholding the majesty of the law." These regulations have been in effect for a period of over two years and it is still not unusual to be called upon to elucidate such clauses as: "and further provided, that the provisions of this paragraph (b) shall not be held to apply to telephone, telegraph or other "signal" wires or cables on poles to which are attached no other wires, as between such wires and poles to which are attached no other wires or cables than telephone, telegraph or other "signal" wires; provided, such wires, cables and poles are not within the corporate limits of any town or city which shall have been incorporated as a municipality."

There may be some reasonable excuse for diversity of opinion as to the interpretation of such statements. It is not maintained that these notes contain all that is implied in the statute, but the analysis is simply a brief exposition of what many engineers have agreed to be the intent and purpose of those responsible for this legal enactment.

Regulations Required by Chapter 499, Statutes of California, 1911.

(The legal minimum herein shall not be understood as prohibiting the adoption of greater clearance where necessary.)

Section 1.

(a) Minimum clearance from center of pole—thirteen inches for wires and cables. (See Fig. 1.)

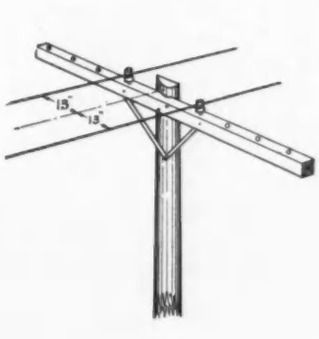


Fig. 1.

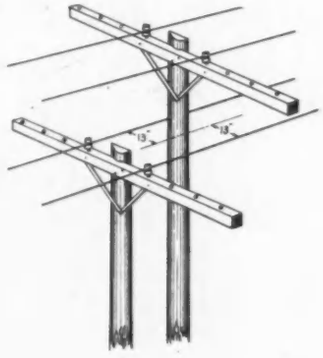


Fig. 2.

Exceptions allowed by law:

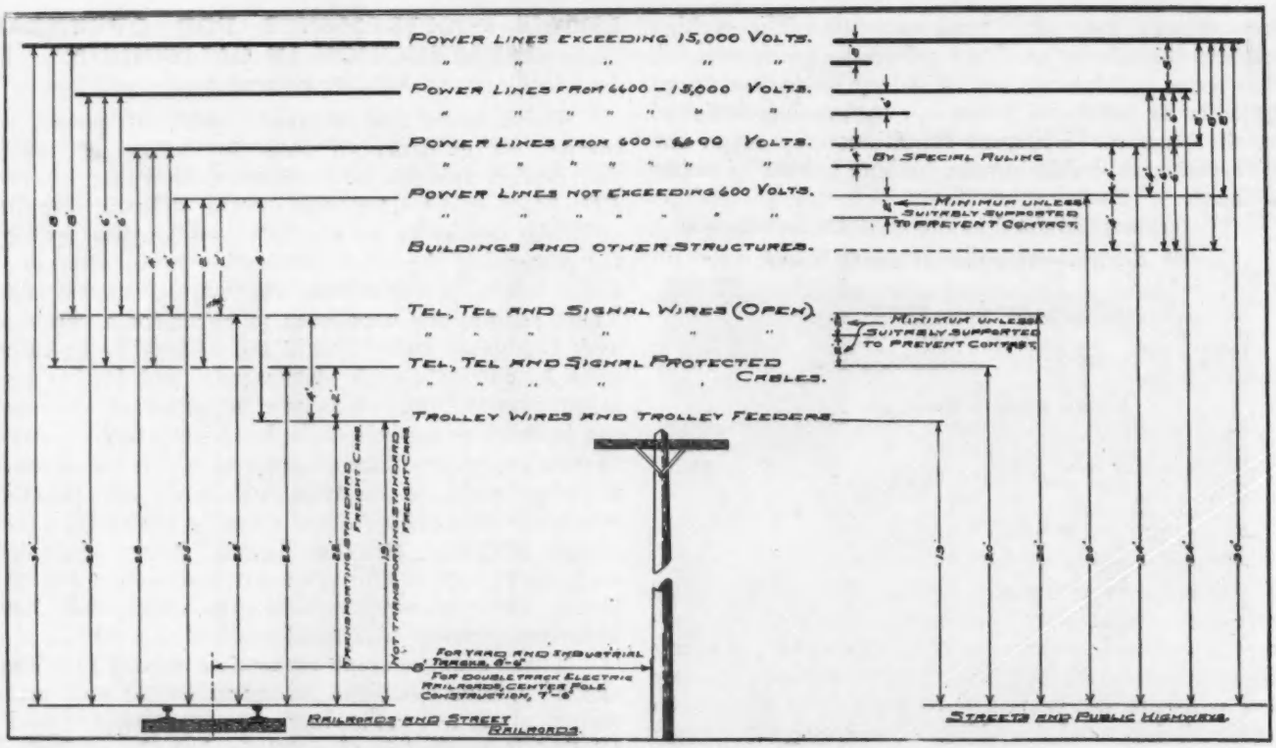
1. Telegraph, telephone and signal wires or cables outside incorporated municipalities where no light or power wires are maintained on same pole.

2. Wires or cables run from underground and placed vertically on pole.

3. Bridle or jumper wires from telegraph, telephone and signal wires or cables.

4. Aerial cable terminals and wires continuing from same where no light or power wires are attached to poles in same location or on same side of street.

5. Wires run from lead wires to arc lamps or transformers.


POWER LINES EXCEEDING 15,000 VOLTS.
POWER LINES FROM 6600 - 15,000 VOLTS.
POWER LINES FROM 600 - 6600 VOLTS.
POWER LINES NOT EXCEEDING 600 VOLTS.
BUILDINGS AND OTHER STRUCTURES.
TEL, TEL AND SIGNAL WIRES (OPEN)
TEL, TEL AND SIGNAL PROTECTED CABLES.
TROLLEY WIRES AND TROLLEY FEEDERS.
BY SPECIAL RULING
MINIMUM UNLESS SUITABLY SUPPORTED TO PREVENT CONTACT.
MINIMUM UNLESS SUITABLY SUPPORTED TO PREVENT CONTACT.
EXCEEDING STANDARD FREIGHT CAR
NOT TRANSPORTING STANDARD FREIGHT CAR
FOR YARD AND INDUSTRIAL TRACKS, 8'-6"
FOR DOUBLE TRACK ELECTRIC RAILROADS, CENTER POLE CONSTRUCTION, 7'-6"
RAILROADS AND STREET RAILROADS.
STREETS AND PUBLIC HIGHWAYS.

Clearances for Wire Crossings Required by California Railroad Commission.

6. Wires or cables attached to top of pole.

Note:—For other exceptions see Section 2.

(b) Minimum clearance from center of pole—thirteen inches for wires and cables. (See Fig. 2.)

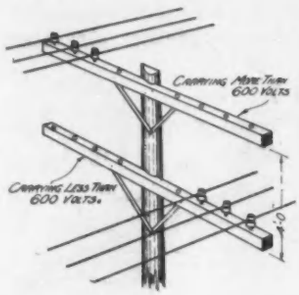


Fig. 3.

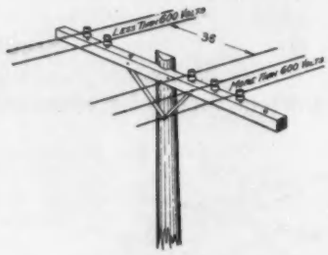


Fig. 4.

Exception allowed by law:

1. Telegraph, telephone and signal wires or cables outside incorporated municipalities where no light or power wires are maintained on same pole or other poles in same line.

(c) Minimum vertical clearance between crossarms carrying more than 600 volts and crossarms carrying less than 600 volts—four feet. (See Fig. 3.)

Exceptions allowed by law:

1. Wires or cables attached to transformers.
2. Wires or cables within buildings or structures.
3. Wires and cables run from underground and placed vertically on poles.
4. Lead wires and cables.
5. One crossarm only, used for light and power distribution. (See Fig. 4.)
6. Alternative clearances, for combination construction for light and power lines. (See Fig. 5.)

Note:—It has been found that the reduced clearances for combination construction are not practica-

Fig. 6.

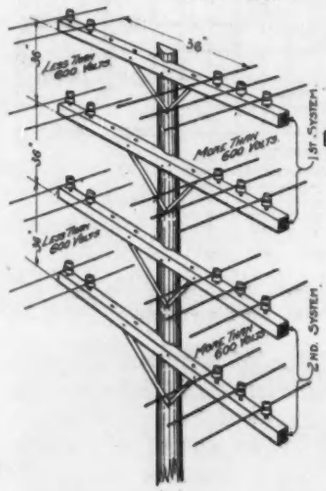


Fig. 5.

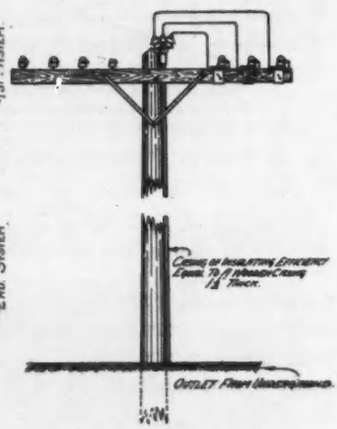


Fig. 8.

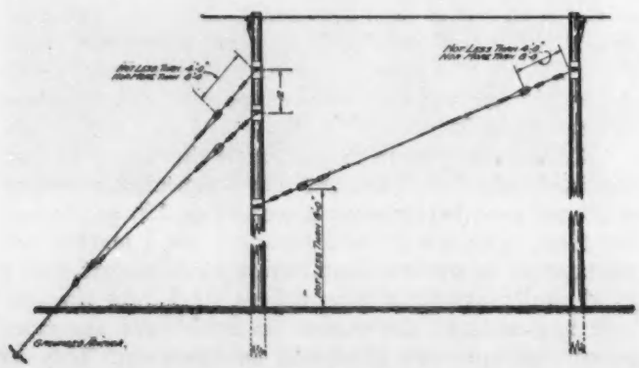


Fig. 7.

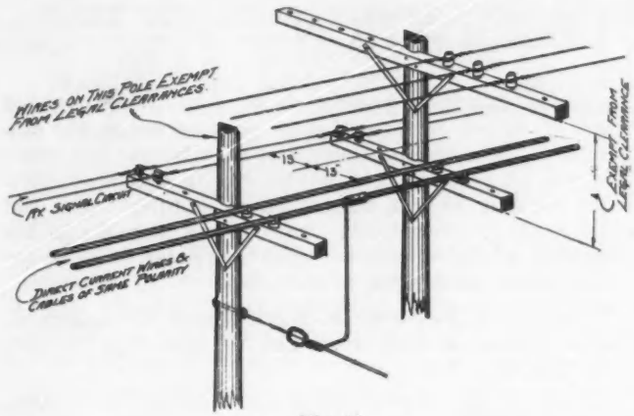

WIRES ON THIS POLE EXEMPT FROM LEGAL CLEARANCES
15"
15"
EXEMPT FROM LEGAL CLEARANCE
TEL. SIGNAL CIRCUIT
DIRECT CURRENT WIRES & CABLES OF SAME POLARITY

Fig. 10.

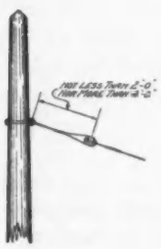


Fig. 11.

of that used in balance of line. Wires of No. 0000 B. & S. gauge, or larger, are excepted from these provisions, and will be considered as complying with the law.

Note:—For other regulations governing crossings for circuits of over 15,000 volts, see Section 9, General Order No. 26, Railroad Commission, State of California.

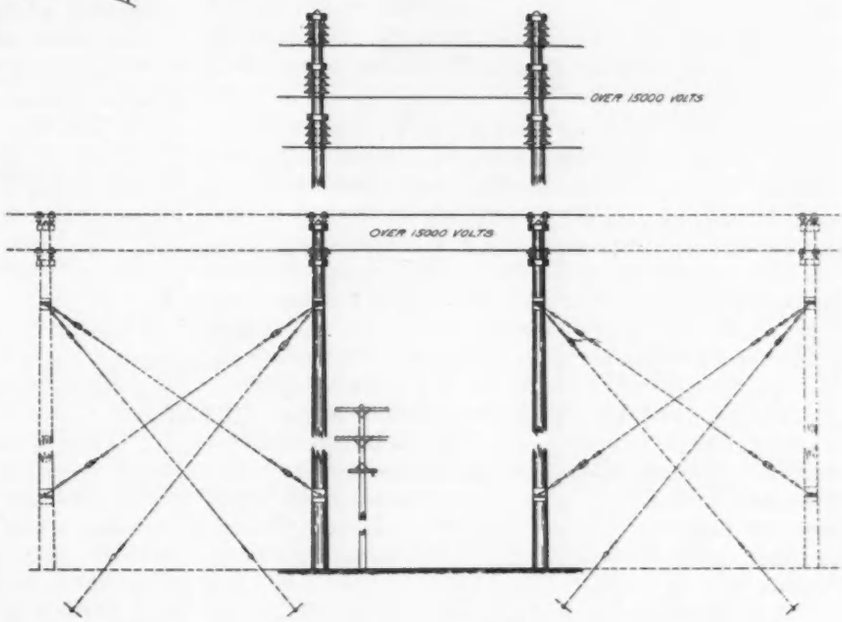


Fig. 9.

ble and from a construction standpoint it is expedient to adopt the more rigid requirements shown in Fig. 3.

(d) Crossarms carrying wires conducting over 600 volts, shall be painted a bright yellow or bear a sign, "High Voltage," on face and back of same; letters to be at least three inches high, white, and on a green background. (See Fig. 6.)

Exception allowed by law:

1. Crossarms carrying over 10,000 volts outside incorporated municipalities.

(e) Guy wires or cables shall be insulated as shown in Fig. 7.

A vertical distance of one foot shall be maintained between points of attachment when two or more guys are attached to same pole.

No insulation is required at lower end of guy attached to grounded anchor.

Exception allowed by law:

1. Guys to poles carrying telegraph, telephone or signal wires or cables outside incorporated municipalities.

(f) Wires used to conduct electricity, placed vertically on poles, shall be wholly encased by casing equal in insulating efficiency to a one and one-half inch wooden casing. (See Fig. 8.)

Exception allowed by law:

1. Vertical telegraph, telephone or signal wires on poles not carrying light or power wires located outside incorporated municipalities.

(g) Arc lamps shall not be attached to poles carrying transformers, or vice versa.

(h) Circuits over 15,000 volts: Legal requirement, high pole, short span, to prevent any wire, if broken, from falling within ten feet of highway or coming in contact with wire leads beneath, of less than 15,000 volts.

Alternative:

1. Double strength construction in crossing span with wire equal to, at least, twice cross sectional area

(i) In addition to the standard bolt and clamp, any messenger cable carrying 75 pair No. 19 B. & S. gauge or over, or 100 pair No. 22 B. & S. gauge or over , shall be attached to supporting member by a safety bolt and clamp equal in tensile strength to a standard bolt and clamp.

Section 2.

None of the provisions of Section 1 apply to d.c. wires or cables of the same polarity, nor to signal wires when but two of such signal wires are attached to one pole. A clearance of thirteen inches shall be maintained between such signal wires or d. c. wires or cables, and the center line of any pole other than the poles to which d.c. wires or cables and signal wires are attached. (See Fig. 10.)

Section 3.

Span wires shall be insulated not less than two feet nor more than four feet from point of attachment to pole. (See Fig. 11.)

Exception allowed by law:

1 Feeder wires used as span wires. (See Fig. 10.)

The 112 California gas and electric companies listed by the California Railroad Commission as operating during 1912, had an operating revenue of $39,904,837, paid $6,060,541 in dividends on a capitalization of $341,651,603.

WATER POWER LEGISLATION

NOTES OF RECENT CALIFORNIA CASES ON WATER RIGHTS.

BY A. E. CHANDLER.

Miller & Lux v. Enterprise Canal Land Co., J. G. Jones Co., et al., 47 Calif. Dec. 1, decided December 20, 1913.

This case is very involved as to the facts controlling, but is equally positive as to the legal principles considered.

The defendant, J. G. James Company, is the owner of lands riparian to Fresno Slough, the connecting channel between the Kings River and San Joaquin River. At flood seasons the waters of the Kings flow northward through Fresno Slough into the San Joaquin, at other seasons the Slough receives its water from the San Joaquin. In an earlier case, Turner v. The James Company, 155 Cal. 82, it was held that the James lands being riparian to Fresno Slough were, therefore, riparian to the San Joaquin.

In the case under comment Miller & Lux, the owners of lands riparian to the San Joaquin both above and below Fresno Slough, sought to enjoin the James Company from diverting the waters of the San Joaquin from a point twenty miles above Fresno Slough through the Enterprise Canal to the lands on Fresno Slough.

The James Company claimed the right to do so as a riparian owner, but the Supreme Court held that although a riparian owner may go above his land and divert water for use on his riparian land when he has the consent of the upper owners, he can not do so without such consent.

The following extracts from the opinion clearly show how superior, exclusive and permanent the doctrine of riparian rights is considered in California.

Again, calling attention to the fact that the diversion of the lower riparian proprietor for use of the water upon his lands is, in its effects, no different from those which would result if the water were taken by a mere appropriator for any other purpose, the conclusion may not be avoided that this court from the first has declared that this may not be done and has in this respect affirmed and adopted the common law doctrine that the riparian proprietor is entitled to the full flow of the stream, reduced only by the proper riparian uses which may be made of the water by proprietors above him. It has said that he may restrain such a taking without showing damage, upon the broad doctrine of riparian rights, that the taking itself is an interference with his freehold which he is entitled to restrain lest it ripen into a prescriptive right.

Respondents, in yielding a reluctant acknowledgment of the force of these decisions, in effect, request that they be swept aside and ask why "if a diversion made by a lower owner should defeat in part the natural irrigation of his upper neighbor's land, upon the policy of our laws, it should not be so?" The answer is this: Many questions touching the use of waters arise in this state which were never known to the common law. As those questions arise they will be treated as cases of first impression and the common law doctrine will or will not be followed as shall seem best for our changed conditions. (San Joaquin, etc., Company v. Fresno Flume Company, 158 Cal. 626.) But this precise question in other forms has been frequently presented and as frequently determined. The rights of the riparian proprietor in this respect have often been defined and his right to this uninterrupted flow of the full stream has been declared to be a valuable right and a part of his title to the soil, so at common law it was also declared. These decisions therefore have become and stand as a rule of property, and at this day to overthrow them would not only work a destruction of property rights, but would result in interminable confusion and litigation in the scrambling efforts of every riparian proprietor to go as far up the stream as possible to get water.

California Pastoral & Agricultural Company v. Madera Canal & Irrigation Co., 47 Cal. Dec. 16, decided Jan. 15, 1914.

Plaintiff, an owner of lands riparian to Fresno River, brought suit to have determined the right of defendant to divert from the river above its lands.

The defendant corporation is a public utility engaged in delivering water to irrigators in the vicinity of Madera. It claimed the right to divert water "to the extent of four hundred cubic feet of water flowing per second, when water to that extent was flowing in said river, and at all other times all of the waters flowing therein."

The trial court found that the defendant for over twenty-five years had diverted from the Fresno River up to 250 sec. ft., when that amount was available, and had diverted the entire flow when less than that amount. The court further found, however, that less than the 250 sec. ft. would be sufficient to irrigate the lands irrigated by defendant, but was unable to determine the exact amount necessary. Judgment was rendered by the trial court giving the defendant the right to divert all of the waters of Fresno River up to 250 sec. ft.

The question in issue "is whether, as against a riparian owner, an appropriator of water can acquire title by prescription to the use, for the purpose of irrigation, of any greater quantity than was reasonably necessary for that purpose?"

The supreme court reversed the lower court and decided the question in the negative. The opinion is important as it reviews earlier cases emphasizing the principle that beneficial use, and not the capacity of the ditch, is the measure of a water right by appropriation. The following paragraph is especially noteworthy:

Whatever right the defendant has acquired by prescription to divert the waters of the Fresno River, is confined to such amount as is reasonably necessary for the lands for which the appropriation has been made. As said in an opinion of the United States circuit court in the recent case of San Joaquin & Kings River, etc. Company v. County of Stanislaus, 191 Fed. 875, it is "based upon and is measured and limited by the beneficial use of certain consumers for which the water is being appropriated," such beneficial use including only such water as is required for the purpose for which it is used.

In order to emphasize the difference between appropriators' rights and those of riparian owners, a principle laid down in Miller & Lux v. Madera Canal Company, 155 Cal. 59, is here repeated:

The doctrine that a riparian owner is limited to a reasonable use of the water applies only as between different riparian proprietors. As against an appropriator who seeks to divert water to non-riparian lands, the riparian owner is entitled to restrain any diversion which will deprive him of the customary flow of water which is or may be beneficial

to his land. He is not limited by any measure of reasonableness.'

Tyndale Palmer et al. v. Railroad Commission of California & Southern California Mountain Water Co., 47 Cal. Dec 201, decided Jan. 20, 1914.

This was a proceeding to review an order of the railroad commission dismissing a complaint of plaintiffs.

The plaintiffs claimed the right to irrigation water (upon payment of rates) from the water company's system on the sole ground that their lands had been included in the "places of intended use" designated in the notices of appropriation posted by the company. They argued that such designation constituted a dedication of the waters claimed in the notice to public use or the benefit of all the territory described.

The supreme court, in denying the contention of plaintiffs, reviewed the history of the development of the doctrine of prior appropriation in California, and in speaking of Sections 1415-1418 of the Civil Code said:

There is absolutely nothing in this statute to indicate that the legislature supposed that the appropriation made in pursuance thereof was in the nature of a grant by the state of any property of the state in the water of the stream from which the diversion was to be made. As stated in Lux v. Haggin, supra, the statute was a consent by the state to the taking of the water so far as it infringed upon the riparian rights of the state by virtue of any lands which it might own situated upon the stream, and to that extent it operated as a grant. But that was a grant of a right which was private in its nature, a right pertaining to the particular tracts of land owned by the state and held by the state only because of such ownership. It was not a general right to the waters of the stream as a whole. And unless it happened that the state owned land upon the stream at the time of the diversion, a condition which in fact seldom occurred, the state would part with no right whatever by the appropriation. As we have seen there was no existing public right in the waters which the state could transfer to the appropriator. The whole purpose of the statute was to provide evidence whereby parties claiming under hostile diversions could establish their respective priorities and corresponding rights to the water and avoid the former difficulties in establishing the precise date of the inception of their respective enterprises.

In a petition for rehearing, the plaintiffs called to the attention of the court an amendment of April 8, 1911, to section 1410 of the Civil Code, which added the following words to the section: "All water or the use of water within the state of California is the property of the people of the state of California." In declaring that the amendment had no application to the case before it, the court said:

The amendment may possibly be effective as a dedication to general public use of any riparian rights which the state, at the time it was enacted, may still have retained by virtue of its ownership of lands bordering on a stream, rights in the stream which it would in such cases have in common with owners of other abutting land. It could not affect the riparian rights of the other owners, nor the rights of any person or corporation claiming under them, no rights previously acquired from riparian owners by prescription, nor rights acquired from the state prior to that time by appropriation under the code, in reliance upon the implied offer of the state to allow its riparian rights to be acquired in that manner, as indicated in the opinion.

It must be remembered that the language quoted immediately above is by way of dictum only and cannot be considered a full legal interpretation of the amendment. It is clear, however, that for all appropriations initiated prior to April 8, 1911, the water subject to diversion is not public water and does not belong to the state.

The court held that as the territory described in the notice was far in excess of the water available and as the company had not supplied or agreed to supply the plaintiffs with irrigation water, it was not legally bound to do so. The railroad commission had previously held that all the water available was necessary to supply the inhabitants of San Diego.

Desert Water, Oil & Irrigation Co. v. State of California, 47 Cal. Dec. 191, decided January 30, 1914.

The Desert Company, a public service corporation, sought to condemn a section of state land within a national forest. The real issue involved was whether the land on account of being included in a national forest was "appropriated to some public use," as the California statutes allow the condemnation of state land not so appropriated. The supreme court held that the land in question had not been so appropriated and was therefore subject to condemnation by the Desert Company.

In reaching its conclusion the court dwelt upon the difference between the public lands of the state and those of the federal government when included in a national forest, and expressed itself very positively on the policy of withholding large areas of federal public lands in reservation and withdrawals. The following quotation is typical of the statements on this point:

But here we desire to point out that while the state of California was admitted as a sovereign state of the union upon equal terms with all the other states, and while it has been judicially declared that an essential part of that equality is the disposition of the public lands within the state, to the end that the revenues by taxation therefrom and the control over them may be vested in the state, we have in California a withdrawal by the United States from sale and a placing in reserve of one-third of the area of the whole state—an area greater than the combined territory of New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New Jersey and Maryland. Not this alone but we have in these withdrawals a refusal upon the part of the United States to yield to the state of California control over its natural sources of wealth. Its forest, its mines, its oil-bearing lands, its power sites and possibilities, have been withheld by the United States, which proposes to exercise over them, and is exercising over them, the "municipal sovereignty" which the supreme court of the United States in Pollards Lessee v. Hagan declared not to exist.

English municipal trading has aroused much interest in the United States, especially concerning the result of municipal operation of public utilities. Consul Halstead of Birmingham has prepared a comprehensive report thereon. It covers the street cars, gas and electric lighting, water, markets, etc., and shows the profits and losses, rates levied for all the different purposes, etc., in the cities of England and Wales. Gas is sold for domestic lighting supply at 26 cents to 87 cents per 1,000 cu. ft., and electricity for the same purpose at 5½ to 12 cents per kw-hr. Considerable profits accruing from operation of the municipal plants are shown as going toward the reduction of taxes.

LIGHTING METHODS

DESIRABLE QUALITIES OF ILLUMINATION.

BY G. H. STICKNEY.

(Concluded.)

Color.

Advocates of various artificial illuminants have, in the past, made claims of white light or an approximation of daylight color. The claims have, in the main, been made without careful laboratory tests and simply from casual observation.

White it not a simple color, but a combination of all colors in a particular proportion. Our best standard of white light has been average daylight, but since daylight varies in color through the different seasons of the year and different hours of the day, as well as with changes of weather, and is influenced not only by the clouds but also by adjacent buildings, foliage, etc., it is a very difficult matter to state exactly what white light is. Nor are our eyes to be trusted to make a judgment of white light, except under particular conditions when a known standard of white light is available. A very intense light is likely to appear more nearly white than it really is; as, for instance, when we look at a mercury tube, which is of a bluish-green color, and very far from white. Again if we are in the presence of a colored light for a long period of time, it appears to approach white, and in contrast to it, actual daylight may appear to be colored.

There is no artificial illuminant of reasonably high efficiency for the lighting of large areas, whose light approaches nearly enough to daylight to be absolutely reliable for the most accurate color-matching. On the other hand, it has often been assumed that daylight color is essential or desirable in a light for general conditions, when, in reality, a suitable tinted light is fully as desirable or even superior for the purposes for which it is to be used. There are relatively few problems in which accuracy of color is essential. The most severe demands for daylight color occur in such places as dye rooms or textile mills and a few other manufacturing establishments. Certain stores or special departments where colored material for daylight use are sold require a close approximation to white light, though ordinarily not to the same extent as the manufacturing processes. Where materials for evening wear are sold, a light of the same color as the prevailing evening illuminations is preferable to daylight, and on account of this fact it is becoming the practice for stores to establish daylight and evening rooms.

Toward evening and on cloudy days, daylight itself assumes a yellowish tint. This, coupled with the fact that firelight and all the early artificial lights had a yellowish or reddish tinge, has caused our artistic senses to be trained so that light so tinted produces the sensations of pleasure, warmth and comfort, which, for ordinary uses of light, are more important than the actual ability to select and match colors correctly.

Wherever artistic effects are sought, as in restaurants, residences, stores, auditoriums, churches, etc., such a color of light is preferable even to white light, and we frequently find people shutting out daylight and going to the expense of providing artificial illumination, simply to secure this effect. On the other hand, unnatural or extreme variation from white light is exceedingly inartistic and unpleasant, and can be utilized only for rough work and at low intensities where comfort and pleasure are ignored,

Steadiness.

Almost no comment at all is needed on the desirability of having a steady intensity of illumination. Everyone has experienced the unpleasant sensations which accompany a flickering or fluttering light. Not only does the fluctuation interfere with our seeing ability and cause pain, but also by straining the muscles of accommodation, is likely to result in more or less permanent injury to the eyes.

Reliability and Continuity of Service.

In any installation, reliability of illumination is desirable, but in certain installations it is of the utmost importance in order to insure safety and continuation of processes of manufacture. It goes without saying that the watchman's and fire escape lights must be absolutely reliable. In places where there is dangerous machinery, interruption in the lighting may result in deaths or serious injury to employes or breakdown in the machinery. In other cases the delay through lack of operation at a single point, may shut down the whole sequence of manufacture in a mill. From this it will be seen that not only for humanitarian reasons, but for economic reasons, it is essential that continuity of service be insured by using reliable illuminants and by so subdividing that any failure that is likely to occur will not cause serious results.

Economy.

There are many problems in which, on first sight, economy or efficiency seem to be secondary, and it is true that in certain installations there are other considerations which out-weigh the element of cost. It would be poor policy to spoil the decorative effect of a magnificent room in order to secure a relatively small saving in the cost of illumination. In general, however, the cost is an important limitation.

Furthermore, we should not confuse efficiency and economy. An efficient illuminant may have a very high maintenance cost, or may not be so adaptable for the requirements as a less efficient unit. A certain amount of light absorbed in securing proper diffusion may actually result in better seeing value.

In artificial illumination we work very much below ordinary daylight intensities, largely on account of cost. In practically all industrial installations and in a large majority of commercial applications it would be desirable to provide a higher intensity of illumination and a better degree of diffusion than the present practice dictates. The standard of intensity in all classes of illumination is rapidly advancing, owing partly to the reduction in cost of lighting and partly

to the growing realization of the economic value of illumination. Thus, broadly speaking, the economic factor should take into consideration not only the cost but the actual value of the results obtained. There are very few instances in which an economic gain could not be made by a reasonable expenditure in improving the illumination, although it would be a mistake to burden a business with illumination which costs more than the business can reasonably afford to pay.

A low cost can best be secured by selecting relatively efficient illuminants, having low maintenance cost, and arranging them so that the illumination can be utilized to the best advantage.

In making economic comparisons, a proper consideration should be made of the investment feature. It is not likely to be good business for anyone to purchase a system which would either prevent him from taking advantage of improved illuminants or leave on his hands a large amount of expensive obsolete apparatus.

Cost of lighting is very frequently a deciding factor in selecting among several competing illuminants. Each item requires careful analysis in order to insure a true result. It is not an easy matter to equate the lighting values of several illuminants, and what might figure out as the most economical for one problem, may be extremely extravagant for another. Many of the items which go to make up the cost of lighting vary with local conditions and circumstances which cannot always be foreseen.

A simple form of illuminant requiring a relatively small investment and little expert handling is always more advantageous than ordinary comparison of figures is likely to show. Illuminants with delicate mechanisms, requiring frequent repairs and expert attention, have, on that account, unknown elements of cost which are likely to be much higher than would appear from casual observation or test, and these items are likely to increase with the age of the installation.

DETAILS OF A UNIQUE LIGHTING SCHEME.

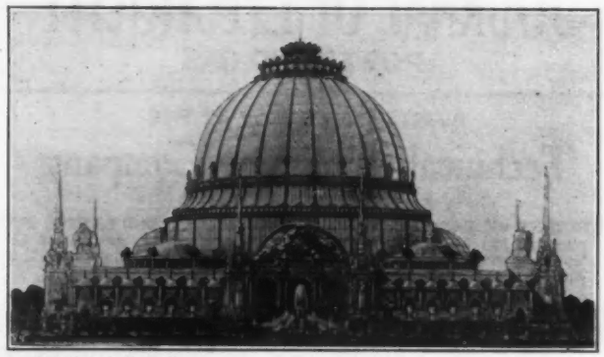
A unique plan for the illumination of the various palaces at the Exposition, has been evolved by W. D'A. Ryan, chief engineer of illumination of the Panama-Pacific International Exposition. Upon his recent return from the East where he has been conducting a series of experiments in one of the largest laboratories of the country the details of the plan for the Palace of Horticulture were explained.

The Palace of Horticulture will be constructed almost entirely of glass and will be surmounted by a dome 150 ft. high and 152 ft. in diameter which will also be fully covered with glass.

If illuminated from the interior by ordinary methods this dome would have presented a "dead" appearance at night instead of being one of the feature spots of the Exposition as it will be with the present scheme in operation.

Sixteen 30-in. searchlight projectors will be placed in a circle about a column in the center of the building.

At the top of the column are arranged a color screen with segments, an opaque vane which will cover two segments at the same time, a lens and a diffusing plate.



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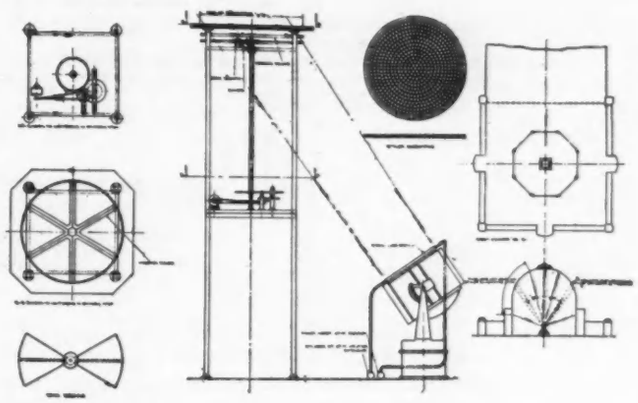
Palace of Horticulture, P. P. I. E.

The segments of the color screen are of red, green and yellow. The screen will revolve at the rate of 500 rev. per minute and the vane at the rate of 499 rev. per minute. This enables the screen to make one full revolution a minute more than the opaque vane.

The rays of the searchlights are focused on the screen and diffused on to the dome, the revolutions causing the various colors of the spectrum to illuminate the glass.



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Details of Mechanism for Interior Lighting of Palace of Horticulture.

A combination of three lens will be used and so arranged that only one will be in position over the screens at one time. One of these will be composed of a number of tiny lenses which will have the effect of producing "spots" of light upon the dome. Another will be plain. The third will produce the most spectacular effect and will present the appearance of millions of tiny tadpoles squirming about the interior of the dome.

The accompanying illustration shows the details of the mechanism.

The world's biggest ocean liner is to be built at Belfast, according to announcements in English newspapers. It will be of 60,000 tons, whereas the Vaterland is of 58,000 gross tons, the Imperator 52,171, the Brittanic 50,000, the Aquitania 47,000, and the Olympic 46,369 tons. The Brittanic, launched at Belfast on February 26th, for safety, will have 48 of the largest lifeboats yet made, two of them fitted with powerful engines.

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POWER AND GAS

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A. H. HALLORAN,
Vice-President

Sworn to and subscribed before me this 23rd day of March, 1914.
(Seal.)
CHARLES EDELMAN,
Notary Public in and for the City and County of San Francisco, State of California.
(My commission expires April 9, 1914.)

FOUNDED 1887 AS THE
PACIFIC LUMBERMAN, CONTRACTOR AND ELECTRICIAN

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ERRATA.

In the article "A Weir Problem," by Ben D. Moses, which appeared in our last issue, line eleven from the foot of right hand column p. 270 should read:

200,000 sec. ft. would be $200{,}000 \div q' = L$,

and not as shown.

A cut caption was also in error in this article, as that at the foot of p. 271 should have appeared under the line cut on p. 273.

The Conservation of Efficiency

The avowed purpose of conservation is to secure to the greatest number of people and therefore over the longest period, the utmost service from our natural resources. Wherever use may be halted without injury to the present, this constitutes the conservation of preservation, and is commendable. Where non-use is waste, or worse, conservation consists in utilization, and where use is essential, increased efficiency becomes the highest expression of conservation.

To paraphrase Dean Swift, the man who produces from one barrel of oil two hundred and thirty kilowatt hours, where only half that number were produced before, deserves the praise of mankind, and is worth more than all the agitators and politicians put together.

Marine propulsion consumes a large part of the world's fuel supply and constitutes a demand which is increasing annually notwithstanding its present vast proportions.

That the propulsion of ships is essential is not of itself an excuse for waste.

Although an ocean liner the size of the Mauretania uses power sufficient for the needs of a city of half a million population, with the consequent enormous fuel consumption, the power generating and utilizing apparatus aboard most ships is notoriously inefficient.

A policy the opposite to that of true conservation generally obtains.

The promise of the future of the conservation of efficient utilization in the operation of steamships may be found in electrical propulsion.

The log of the good ship "Jupiter" relating to her official trial trip, as written by Mr. H. A. Russell and published in this number, is of more than passing interest in that she is the first vessel of any considerable size in which this principle has been developed and satisfactorily applied.

At first the proposition seems absurd, for it is self-evident that propelling a vessel by electricity involves the conversion of mechanical energy into electricity and its reconversion into mechanical work at the propeller shaft.

The answer is that electrical propulsion not only permits the use aboard ship of the steam turbine, but provides for its efficient operation at the most advantageous speed.

Operation, as well as installation, is simpler.

With this new equipment remarkable efficiencies are now and may be expected. Even since the planning of the "Jupiter" engineering skill has already produced similar apparatus, still more efficient.

As it is, the equipment economizes in space and weight and permits a more extensive cruising radius than heretofore, an advantage to all vessels and especially so to warships.

Previous articles and editorial comment in this journal have detailed the equipment, and this new article emphasizing anticipations realized marks a great forward movement in the realization also of that desirable conservation which efficiency constitutes.

Private Ownership Pioneering

It is private ownership pioneering which awakens sleeping communities and starts them on the road successward. Directly such privately owned public utilities commence expenditures, property values increase, due not only to the greater facilities then assured, but, also, as a promise of the future, to the increased populations which follow always in the wake of such improvements.

Later generations sometimes fail to appreciate the relationship between the success of the public utility and that of the community, and blind to their enormous moral debt of the past, endeavor to condemn the property of the privately owned utility for their own appropriation and use.

Throughout the lean days of development the private utility, as a hazard, struggled onward and upward. Everything was new and use necessitated education of the public, especially where the service sold was electric light and power.

At first the public was afraid, but with tremendous effort the central station companies caused them to look favorably on their service. The public has, perhaps, been overtrained, and now, like Oliver Twist, eternally asks for more.

But of the utility the public says: "This is the heir; come let us kill it that the properties may be ours."

Yet before the utility came that public was content with the existing order with its candle light, manual power, pedestrian proclivities and limitations. Unambitious for change, with highways which might have been used to facilitate electrical transportation and distribution, with property which might be assessed for the purpose of public works, and even with the industrial world ready to provide equipment for their needs, the public, failing to grasp its opportunity, slept.

It is private ownership pioneering, urged by a desire to serve, which arouses these communities from their Rip van Winkle sleep, and by utilizing some of their neglected opportunities, gives to them all the advantages of electricity in its application to human needs.

Seeing the progress made—the beginnings of a success for the private corporation—the public considers that the heights of endeavor have been scaled and the principle is expressed, "Let us build three tabernacles," But now, as ever, the voice cannot be silenced, for private enterprise urges, "Get thee hence, for this is not thy rest." Improvement and progress cannot be persuaded to stand still.

Private enterprise may mock the efforts of those who under a cloak of public ownership would take from the private corporation the present just reward of its pioneering endeavor.

The decalogue of today abhors injustice, and if it is shown that municipalities (the public) may condemn such property for their own use, then the power to regulate public utilities should simultaneously be withdrawn from them.

Otherwise who is it regulate the regulator?

In such instances the regulator is governed by and should express the principle of justice, which is its purpose.

Remove justice and automatically you abolish the regulator.

Private ownership pioneering by the impulse of its power and purpose is entitled to and should receive justice in full measure.

And if municipal ownership must be, why not try it out in virgin territory? Elsewhere there is undeveloped water power and a myriad sleeping communities.

But they are not self-starting.

Western Electrical Pre-eminence

There is an old adage that "figures don't lie." This is and is not true, depending entirely upon who does the figuring. Numerical facts —statistics—do not lie. Here the word "statistics" is used in connection with figures gathered by direct enumeration and honestly collated.

In the collection of nation-wide statistics the human element, with the possibility of error in isolated instances must enter, but with an area under consideration as large as the United States, accidental divergencies tend to neutralize each other, and their baneful influence upon accuracy is in this way eliminated.

Statistics bear the same relation to the administration of government that a good system of bookkeeping does to any business. Accuracy is essential.

In the consideration of statistics those gathered by government are most reliable, coming as they do from an unprejudiced source, representing the most comprehensive and thorough method of collection, and being published without fear or favor.

When government does the figuring, it is safe to assume that figures do not lie.

It is therefore at once refreshing and stimulating for the West to turn to and consider the electric lighting statistics recently issued by the Bureau of the Census and referred to, in tabloid, in the map published in our issue of last week.

That the West leads electrically is seen at a glance, which at the same time approvingly endorses the West as of premier importance to those interested in the sale of things electrical.

It is not suprising that in Pacific Coast cities are to be found central stations having the highest load factors of all comparable companies in the United States. Corroboration, if such were necessary, that the West does know how to "Do It Electrically," and that the West is prepared to follow out that program wherever any manufacturer will prove that the electrical way, or his particular path along that way, is best.

To the Journal this is a cause for congratulation and commendation.

For the past twenty-five years the Journal has been interested, and, we may add with all modesty, partly instrumental, because of our advantageous position and its opportunity seized, in contributing to this incomparable growth and leading electrical position of the territory we principally serve—the West.

The Journal takes this opportunity to congratulate its readers and advertisers on the wonderful Western progress shown by these statistics.

PERSONALS

ITEMS FOR THIS DEPARTMENT ARE SOLICITED FROM ALL READERS

Fred F. Skeel, sales manager Crouse-Hinds Company, Chicago, Ill., is at Los Angeles.

George Cook, of the American Cross Arm Company, spent Thursday of last week at Seattle.

W. H. Leffingwell, hydraulic engineer Mono Power Company, Bishop, Cal., is at San Francisco.

George J. Henry, consulting hydraulic engineer, San Francisco, has returned from Salt Lake City.

E. B. Criddle, district manager, Southern Sierras Power Company, Bishop, Cal., is at San Francisco.

H. T. Hays, purchasing agent Mt. Whitney Power Company, was recently at San Francisco from Visalia.

Howard J. White, manager, Keeler, White & Company, manufacturers' agents, San Francisco, is at Seattle.

W. N. Chatfield, general manager, Pacific Power Company, Bodie, Cal., was a recent San Francisco, visitor.

W. L. Goodwin, baseball fan extraordinary at San Francisco, is trying to solve the question "Why is a Tiger?"

Frank E. McCoy has joined the sales force of the Benjamin Electric Manufacturing Company at San Francisco.

Hal Lauritzen, manager, Western Division Holophane Works of General Electric Company, is at Los Angeles, Cal.

K. G. Dunn, vice-president Hunt, Mirk & Company, engineers and contractors, was at Los Angeles recently on business.

H. C. Goldrick, Pacific Coast manager, Kellogg Switchboard & Supply Company, San Francisco has returned from Hawaii.

J. O. Presbey of the Holophane Works of General Electric Company, is spending a month at Seattle on company business.

O. S. Hansen, of the National Pole Company, Everett, Wash., was at Seattle on business during the early part of last week.

Sylvester A. Baker, Pacific Coast representative Macbeth Evans Glass Company, has returned to San Francisco from Salt Lake City.

W. W. Torrence, local manager, General Electric Company, Salt Lake City, has returned from his regular trip of inspection to the factory.

J. M. Smith, assistant to sales manager, Holophane Works of General Electric Company, Cleveland Ohio, is expected to arrive in San Francisco shortly.

Grover Anderson, salesman for the Electric Appliance Company in Arizona territory, is making his regular call at the home office, San Francisco.

C. C. Barrick, president of the Union Metal Molding Company, Canton, Ohio, is visiting Pacific Coast cities and spent last week at San Francisco.

W. W. Low, president, Electric Appliance Company, Chicago, Ill., who has been spending several weeks on the Pacific Coast, is now en route East.

S. Warren Mays, representing American Cyanamid Company, Nashville, Tenn., was a recent visitor at San Francisco and has now left for Los Angeles.

E. W. Price, formerly electrical contractor and dealer of Vancouver, B. C., is at San Francisco with the object of engaging in business somewhere in California.

C. B. Babcock, Pacific Coast representative, General Gas Light Company, has returned to San Francisco from a business trip made throughout Southern California.

Miles F. Steel, sales engineer, Benjamin Electric Manufacturing Company, is again in San Francisco, having made a very successful business trip throughout the Pacific Northwest.

A. J. Myers, district manager of the Wagner Electric & Manufacturing Company, has returned to his San Francisco office from an extended trip through Southern California and Arizona.

C. L. Fraser, Wm. B. Bennett, M. E. Heberling and **Wm. Ingram,** of the meter department, Mt. Whitney Power Company, Visalia, Cal., enjoyed an extended visit to San Francisco last week.

W. R. Studenmund, representing Gillinder & Sons, Inc., manufacturers of illuminating glassware, is back again at his office in San Francisco, having completed a business trip through Southern California.

Geo. Hughes, president of the Hughes Electric Heating Company, was a Seattle visitor last week and also visited Bellingham, Wash., in company with **H. D. Brainard,** local manager Western Electric Company, Seattle.

Allen E. Ransom having completed his duties as receiver and trustee of the Caldwell Machinery Company, has opened an office as manufacturers' agent for pumping and hoisting equipment in the Colman Building, Seattle.

C. R. Bishop, secretary and manager, American District Steam Company, New York, was at Portland during the past week. **E. L. Barnes,** northwest manager of the company with offices at Seattle, also accompanied Mr. Bishop.

Z. S. Gwaltney has accepted a position as manager of the Salt Lake Electric Supply Company. Mr. Gwaltney comes to Salt Lake from Kansas City, where he has been engaged in the electric supply business for several years.

C. H. Carter, district manager Pacific States Electric Company, has returned to Los Angeles after having made an extended Eastern trip, during which he visited the headquarters of various manufacturers represented on the Coast.

C. M. Clark, of Philadelphia, chairman board of directors, Portland Railway, Light & Power Company, was a visitor at San Francisco last week, accompanied by Mrs. Clark and Edward W. Clark. **Franklin T. Griffith,** president of the company, was also one of the party, who are now en route East.

Ralph B. Clapp, one time Jovian Statesman at Los Angeles, who recently deserted the electrical field, has made a quick return, which will be pleasing to his many friends among the electrical fraternity. Mr. Clapp is now associated with F. Foster & Company, agents for industrial and electrical equipment, 443 East Third street, Los Angeles, Cal.

J. A. Spears, as manufacturers' representative, has opened offices in rooms 224 and 228 Monadnock Bldg., San Francisco. Mr. Spears was connected with the electrical department of the H. W. Johns-Manville Company from which he resigned to engage in this new business, and was formerly sales engineer with the Holophane Works of General Electric Company.

OBITUARY.

L. N. Peart, general superintendent of the San Joaquin Light & Power Company, and **J. E. Burgess,** assistant superintendent of the company, met death by drowning on March 28, 1914. Both were of an automobile party, which was precipitated into the San Joaquin River with the machine when a suspension bridge broke over which they were crossing. Three others were also drowned at the same time. The San Joaquin River at the point where the auto plunged from the broken bridge is extremely swift. An eye-witness of the accident stated that both men rose once to the surface and were then rapidly carried away by the current. It was at first thought that the superintendent and his assistant might have saved themselves, but after searching parties had traversed the banks of the river for several miles hope was abandoned. They were both graduates of the University of California. Mr. Peart had been connected with the power company for ten years.

MEETING NOTICES.

San Francisco Section A. I. E. E.

On Friday evening, March 27th, a large attendance of members and friends at the Engineers' Club, listened to the presentation of a paper on "Economics of Electrical Transmission and Distribution," by C. L. Cory. It evoked an interesting discussion. The paper and discussion will be printed in full in an early issue of this journal.

Seattle Jovian League.

The Jovians met at luncheon at the Lincoln Hotel Friday, March 27th. Thirty members present enjoyed a one-half hour after dinner talk by Mr. Carson, chairman of the "Safety First" committee of the Puget Sound Traction, Light & Power Company. Mr. Carson's talk gave the members present a clear insight as to what has been done and is being accomplished towards decreasing the number of accidents in transportation due to carelessness of employes and the public.

Utah Electric Club.

At the regular meeting held at the Commercial Club March 26th, Willard Done, State Commissioner of Insurance, spoke to the subject, "What the State Is Doing to Protect the Insured." He outlined clearly the relations which exist between the insurance companies, their agents, and the insuring public, and the manner in which the state supervises the placing of insurance so as to protect the interests of all three. He paid a high tribute to the insurance agents doing business within the State, saying that with but few exceptions they are working to the best interests of their policy holders.

Twin Falls Jovian League.

Professor Hylon T. Plumb of the engineering department of the General Electric Company, with headquarters at Salt Lake City, delivered a lecture on the subject of "Electricity on the Farm" at the Commercial Club rooms, Twin Falls, Idaho, on Saturday evening, March 21st. The lecture was illustrated with lantern slides and presented in a highly interesting and instructive manner. Arrangements have been made to have other lecturers discuss electrical subjects before the Jovian League of Twin Falls during the next few months. H. T. Fulton is president of the league and H. S. Bates, secretary.

Alameda County Electrical Development League.

The regular monthly luncheon at Oakland was held on March 28th, there being a large and enthusiastic attendance. The chief subject for discussion was the advisability of endorsing the work of league members, but following the statement that the electrical contractors' association had this plan in mind it was decided that the league should take no present action. The establishment of a Grievance Committee was also considered and will be decided at the next meeting. The secretary was instructed to request the Society for Electrical Development to establish a Pacific Coast office.

Joint National Committee on Electrolysis.

At the first meeting of the present members of the Joint National Committee on Electrolysis, held in New York on May 27, 1913, it was decided, owing to the fact that certain national associations had not at that time appointed representatives to serve on the committee, to have a temporary organization only, and await the meeting of the full committee before perfecting a permanent organization.

At this meeting Bion J. Arnold was appointed temporary chairman, and he was requested to confer with the National organizations not at that time represented on the committee.

The Jovian Electrical League of Southern California.

The weekly luncheon of the League on March 25th, which was well attended, was held at Christopher's, Los Angeles, and was presided over by W. F. Rath. A stirring and eloquent description of a Mexican bull fight was given by Judge James J. Banks, formerly of the supreme court of Alabama, who had only recently witnessed such a contest between the cool intelligence of a human being and the brutal strength of an enraged beast. The judge referred to this cruel sport as the great equalizer in Mexico.

The League placed itself on record as favoring the setting aside of March 21st of each year as Southern California Orange Day. Announcement was made of a pool tournament to be held on April 8th for the purpose of raising money for the Jovian degree team trunk.

Utah Light & Railway Company Section, N. E. L. A.

The regular monthly meeting was held at the Consolidated Music Hall Wednesday, March 25th. This was the first session held in this hall, arrangements having been made by the company to hire it for the regular meetings of the Section. Morrill N. Farr and G. B. Walker were appointed a committee to arrange for the Section's big outing and field day to be held early in June at Pine Crest, the new hotel and summer resort opened at the head of Emigration Canyon.

The paper of the evening was presented by Wm. M. Scott, superintendent of electric lines and service, entitled "The Relation Between the Company and Its Employes." Mr. Scott's paper was one of the most valuable which has been presented to the Company Section. His wide experience during the past twenty years of his employment with the company has admirably fitted him to handle this subject.

Electrical Development and Jovian League.

Last Tuesday's meeting was electrical vehicle day at the League, as in addition to the League members some thirty or more men interested in the electrical vehicle business sat down to luncheon. The meeting was called to order by H. R. Noack who acted as chairman in the absence of President Neiman and explained that one of the objects of the gathering was to afford the vehicle men an opportunity of forming a Pacific Coast section of the National Vehicle Association. After addresses by Messrs. I. L. de Jongh and C. W. Hutton, the business end of the meeting was turned over to Mr. A. H. Halloran, secretary of the former Pacific Coast Electric Vehicle Association, who took up the question of permanent organization.

Upon motion of those present Mr. Stanley Walton was elected chairman, C. W. Hutton, vice, chairman, and J. W. Redpath, secretary of the new section. Messrs. E. M. Cutting, W. C. Logan, George R. Murphy, I. G. Perin, A. G. Jones, O. W. Lilliard and W. D. Vance, were elected members of the executive committee. The new branch of the association should serve to arouse considerable interest in the electric vehicle and contribute to the extension of that business.

The new meeting place of the League appears to curry much favor as the attendance at meetings is rapidly increasing.

PUBLICATIONS RECEIVED.

How to Build up Furnace Efficiency is the title of a 5x7 in. booklet with stiff paper covers, written and published by Jos. W. Hays, combustion engineer, Rogers Park, Chicago, U. S. A. It contains 126 pp. and is well illustrated. It has chapters on why and how fuel is wasted, how to detect and stop this waste and how to keep it stopped.

PLAY BA—A—ALL.

Peddlers vs. Pawnbrokers.

All-star nine of pickled peddlers, recruited from the ranks of itinerant salesmen, will play the Pacific Gas & Electric's purchasing department players at Ocean Shore Grounds, Twelfth and Mission streets, San Francisco, Saturday, April 4th. Game called at 2:30 p. m. Stakes—a big French feed. Come one—come all. Pirates welcome this time only. Parking privileges provided for your autos.

CALIFORNIA ASSOCIATION OF ELECTRICAL INSPECTORS

Section of N. A. E. I.

C. W. Mitchell, President. Arthur Kempston.
Wm. G. Pennycook, Vice-Pres. B. C. Hill, Executive Comm.
John W. Carrell Secretary-Treasurer, 55 Fulton, San Francisco.

The purpose of this organization is to standardize the common practice in electrical construction with the National Code as the general standard.

Questions pertaining to electrical construction will be answered in these columns, but only from the point of view of the Code. This is a voluntary organization and the answers published under this heading must not be construed as authoritative, or binding. No attempt will be made to correllate the answer from the several Inspection Districts, as an occasional difference of opinion will tend to induce further study on subjects. All questions will be passed upon by an executive committee.

Address all communications to the secretary.

By the Secretary.

The regular meeting of the Section, held Saturday, March 28th, at the Merchants' Exchange Building, showed an increased membership and an unabated enthusiasm. Almost the entire time was consumed in reviewing the wonderful array of data on electrical appliances compiled by the Fire Underwriters and presented by Mr. Mitchell. The sessions will now be devoted to actual construction in buildings, starting from the place of connection to the source of supply and "following the feed" through the building. The next topic will be Main Service Wiring.

One thing that the meetings have emphasized is that inspectors should be liberal minded men. **The creed of the egotist:. "An agreeable person is one who agrees with me. That which I believe is right absolutely, and that which you believe that I believe is right also, but that which you believe that I do not believe is wrong, has little place among us."** Our members are fully persuaded that all the brains in the electrical fraternity are not confined to the several inspection bureaus and realize that suggestions along the line of the work and especially questions on actual construction, are a valuable asset. Above all send us your questions.

Questions and Answers.

Ques. 1. Does the Code require gas pipes above insulating joints to be protected with insulating tubing where outlet boxes are used?

Ans. 1. Yes. Rule 30 (a).

Ans. 2. Yes. Refer to Rule 30 (a). My interpretation of this rule does not necessarily call for insulating the pipe above the insulating joint, but would accept flexible tubing extending below insulating joint from where wires enter tne outlet box, if fastened with approved loom clamps.

Ans. 3. No. If I did, I would require a lined box also.

Ans. 4. Yes. Rule 30 (a) of the Code.

Ans. 5. No. The Code recommends, but does not require outlet boxes to be used and does not treat this point where outlet boxes are used. I presume the question applies to knob and tube work. Under the heading of Armored Cable and Conduit no mention is made of this subject.

Ques. 2. A straight electric fixture is supported from a conduit system, is wired with No. 16 rubber covered and has three receptacles, each having porcelain shells. Does the Code require an insulating joint?

Ans. 1. Yes. Rule 30 (a).

Ans. 2. Yes. Refer to Rule 30 (a) Code. If No. 14 wire were used I would not require an insulating joint.

Ans. 3. No. While the insulation on No. 16 wire is not of the same thickness as that of No. 14 it is made for use where the potential does not exceed 600 volts. See Rule 50.

Ans. 4. Yes.

Ans. 5. No, if No. 16 wire with three-sixty-fourths insulation is used. Yes, if ordinary No. 16 rubber covered is used.

Ques. 3. Armored cable is used for a vertical run from a junction box in the ceiling of the first story to a point on the side wall seven feet above the floor of the second story. Does the Code require the armor of the cable to be grounded?

Ans. 1. Yes. Code 27 (c).

Ans. 2. Yes. Refer to Code, Rule 27 (c). In this city the local rules make exceptions and do not require grounding of armored cable or conduit if length does not exceed ten feet where the potential difference between the wires does not exceed 125 volts.

Ans. 3. Yes. See Code Rule 27 (c).

Ans. 5. Yes, 27 (c).

COLUMBIA AND SNAKE RIVER WATERWAYS ASSOCIATION.

The fifth annual convention of this association will convene at Portland, Oregon, at 10 a. m., on April 13, 1914, and will continue until the evening of the 14th. All sessions will be held at Portland Commercial Club, Fifth and Oak streets. The formal sessions will be devoted to the discussion of waterways and allied topics. The annual meeting of the board of directors will first take place and after the annual address of Geo. F. Richardson of Kennewick, Wash., president of the association, the afternoon will be devoted to a presentation of papers and discussion on navigation subjects. A reception will be tendered to delegates and visitors by the united commercial and business men's organizations of Portland, A. H. Averill, president Portland Chamber of Commerce, presiding. Governors of the states of Oregon, Washington, Idaho, Montana and of the Province of British Columbia are expected to participate.

Other navigation matters of importance will be discussed at the morning session of the 14th.

At the afternoon session the principal paper will be "Hydroelectric Development of the Columbia and Its Tributaries," by Hon. H. B. Miller, chairman Oregon Hydroelectric Commission, of Portland. Discussion will be led by Robert A. Foster, manager Lewiston-Clarkston Improvement Company, of Clarkston, Wash., and Hon. James Allen, Washington State Hydroelectric Commissioner of Olympia. Other papers to be presented will deal with various phases of water transportation and navigation and the session will conclude with a series of moving pictures of the various projects and waterways discussed.

NEWS OF THE CALIFORNIA RAILROAD COMMISSION.

The commission has rendered a decision in which it suspends, until the 15th of April, any final order on the application of the Hermosa Beach Water Company to withdraw from territory embraced within the limits of the city of Manhattan Beach. The company serves Hermosa Beach, El Porto and Manhattan Beach.

The commission rendered a decision granting authority to the Pacific Gas & Electric Company to issue $7,000,000 of one year 5 per cent notes, the notes to be secured by $5,000,000 of the company's general lien bonds and $5,000,000 of the company's general and refunding bonds. The notes will mature on March 25, 1915.

The commission has rendered a decision authorizing the Oakdale Gas Company, operating in Stanislaus county, to issue first mortgage 6 per cent 25 year bonds of the face value of $13,000 and 8000 shares of its capital stock of the par value of $1 per share. Bonds and stock are to be sold at not less than 80, so that the net proceeds of both to tne company shall be at least $20,000.

The commission has rendered a decision in which it modified its former order made on the application of the Los Angeles Gas & Electric Corporation to issue $900,000 in bonds. The original order required that the bonds net not less than 94⅛ on the first $250,000 and not less than 94⅝ on the remaining bonds; $400,000 of the amount authorized has been disposed of. The modification permits the company to sell the balance at not less than 92 plus accrued interest.

THE ELECTRICAL CONTRACTORS' DEPARTMENT

ESTIMATES RELIABLE AND COMPLETE.

The San Francisco Local chapter of the California State Association of Electrical Contractors has developed and published for the benefit of its members, blank forms which will be conducive to more reliable and complete, and probably more uniform estimates than has heretofore been the case.

These consist of a Data Sheet (Fig. 1.) onto which is transferred from the plans and specifications all the material which will be required for carrying out the full intent of the plans and specification. These quantities are then summarized on the same sheet which is here reproduced, the blank space for entering the quantities having been omitted. This data sheet measures 10½x18½ in. It is ruled on one side only, the opposite side being left for the entry of any additional data required.

The quantities in this way determined are then entered upon the Electrical Estimate Sheet (Fig. 2) with headings as shown on the second illustration herewith. This sheet is so

ELECTRICAL ESTIMATE SHEET

DATE — PREPARED BY — ESTIMATE, No.

OWNER — SAN FRANCISCO DISTRICT LOCAL NO. 1 — BID TO

LOCATION — THE CALIFORNIA STATE ASSOCIATION OF ELECTRICAL CONTRACTORS — ARCHITECT

LABOR — VARIABLES — COST — LABOR — CONSTANTS — COST

Fig. 2.

arranged that the amount of the labor for the installation of each item may be placed opposite to it, also the unit cost and total cost of all quantities called for. These items are listed under two divisions, the Variables, like the goats they are, on the left, and the Constants on the right.

The variables listed are as follows, though ample provision is made for any additional items that may occur:

Service Switch, Service Switch Remote, Time Switch, Floor Receptacles, Base Receptacles, P. B. Switches, 3 W Switches, Lock Switches, Door Switches, Pendant Switches, Circuit Porc., Circuits on Panelboards, Trim for Panelboard, Main Switch Board, Case or Screen, Pull Box, Load Center Panel, Meter Panel, Meter Loops, Drop Cords, Lamp Receptacles, Lamps and Guards, Fixtures.

Power. Feet of ½ in., ¾ in., 1 in., conduit or of other sizes. Feet of service conduit. Feet of wire (by numbers), service wire and lead wire. Switches.

Tel. and Messsengers. Feet, No. 18 Triple Wire, 19 Twist. Pair, 14 Ground Wire, 16 Wire, 18 Bridle Wire, 19 Bridle Wire, Pr. Lead Cable, ½-inch Conduit, Leader Pipe, Outlet Boxes, Terminal Strips, Terminal Boxes, Telephones, Annunciator, Bells and Buzzers, Push Buttons, Batteries and Trans., Door Opener, Bell Wire, Letter Boxes, Speaking Tubes and Whistles, Burglar Alarms.

These are then summarized under Material, Labor, Total Variables.

Constants are itemized as follows:

Outlet Boxes, Covers, Stems, Boxes (Receptacle), Boxes (Switch), Covers (Switch), Panel Boxes, Locknuts, Bushings, Pipe Straps and Hanger, Toggle Bolts.

Branches. Feet of ½ in. Conduit, ¾ in. Conduit, 1 in. Conduit, Metal Moulding, Metal Moulding Fittings. Feet of 14, 12, 10 Duplex Wire, Knobs, Bushings, Flexible Conduit.

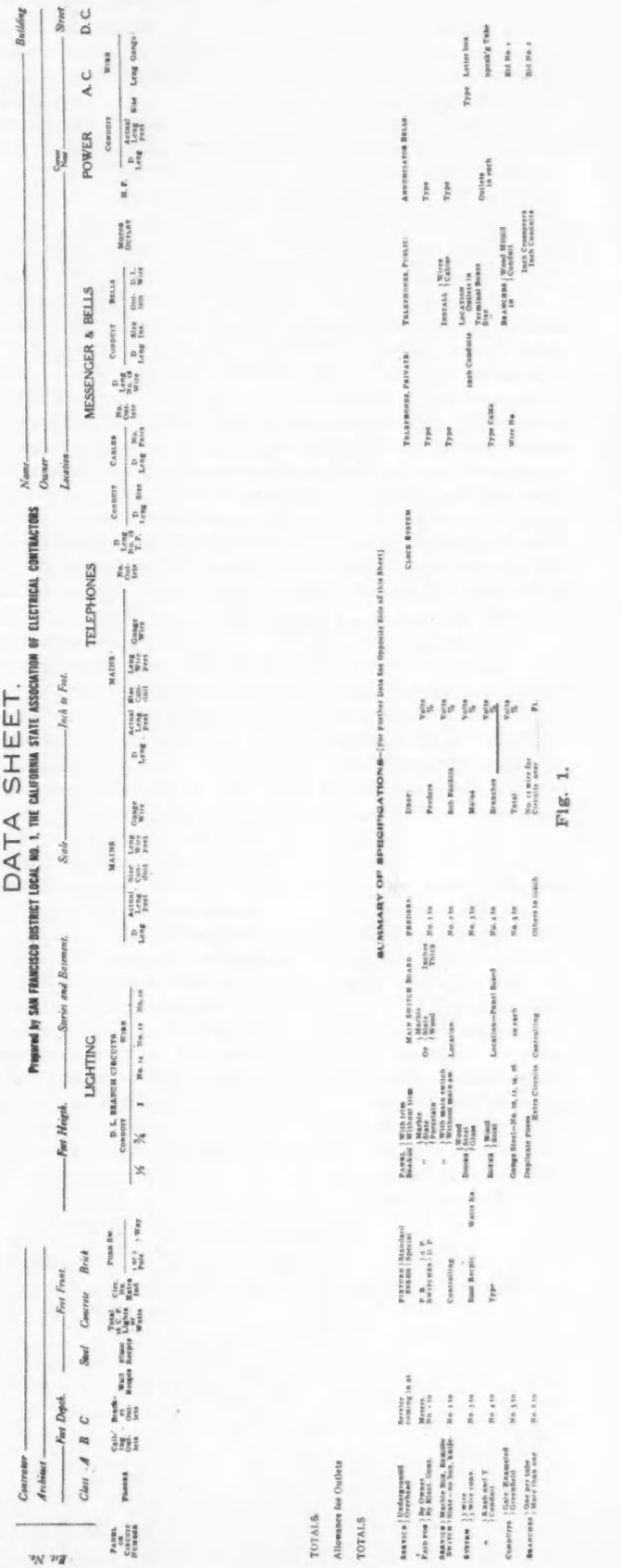
Mains. Feet of Conduit (by sizes), Conduit for Service, Service Wire, Lead wire, Condulets, Elbows, Tape, Solder, etc., Ground Clamps, Miscellaneous.

Inspection, Service Connection, Bond, Fire Insurance, Compensation Insurance, Car Fare, Cartage, Drafting.

These are all summarized and the Cost of the Constants and of the Variables, added together. This total cost secured the Overhead is added together with the profit desired and the complete bid arrived at in this way.

The use of these forms should simplify the preparation of assured and reliable estimates and their general adoption would also tend to overcome the absurd differences in the amounts of different contractors when the bids are opened.

Further particulars may be secured from W. S. Hanbridge, secretary, state of California, Electrical Contractors' Association, San Francisco, Cal.


DATA SHEET.

Prepared by SAN FRANCISCO DISTRICT LOCAL NO. 1, THE CALIFORNIA STATE ASSOCIATION OF ELECTRICAL CONTRACTORS

Name _____ Building

Owner _____

Location _____ Corner _____ Street

LIGHTING — MAINS — TELEPHONES — MESSENGER & BELLS — POWER — A.C. — D.C.

Contractor _____

Architect _____ Feet Depth. _____ Feet Front.

Class A B C Steel Concrete Brick

_____ Feet Height. _____ Stories and Basement. Scale _____ Inch to Foot.

SUMMARY OF SPECIFICATIONS—(For Further Data See Opposite Side of this Sheet)

TOTALS

Allowance for Outlets

TOTALS

Fig. 1.

INDUSTRIAL

SHORT-CIRCUITED TEST OF A LARGE GENERATOR.

In the presence of a number of representatives of central stations, the engineers of the Westinghouse Electric & Manufacturing Company deliberately short-circuited a 16,700 k.v.a., 8800 volt generator, running at full speed and without resistance or any other protection in the circuit. Oscillogram records showed that a current of 21,000 amp., or 12½ times normal, flowed through the generator.

With generators designed some years ago such a test would have wrecked the machine but in the present instance no damage resulted whatever. The only visible effect was a static flash between the field and the armature.

The test was performed to prove the fact that generators are being built that require no outside protection from outside short circuits, the generator itself being so designed as to be self-protecting. Unless the generator is properly constructed a complete short circuit tears out the armature coils, which, coming into contact with the revolving field, causes extensive wreckage. Furthermore, the static flash, which always occurs under such circumstances, will destroy inferior insulation. With generators of the type tested both results are guarded against by firmly securing the armature coils and bracing their ends and by the use of mica insulation. In consequence even so severe an ordeal as this test was withstood without harm, although it has been repeated many times with the same machine.

In connection with this test several others were carried out in order to prove the reliability of circuit-breakers and reactance coils for protecting the feeder circuits. The generator was repeatedly short-circuited through these devices which stood up admirably under the enormous stresses to which they were subjected.

The practice recommended by the Westinghouse engineers is to protect the feeders and not the generators. If the generators are protected and a short circuit occurs on any of the feeders, even a poorly designed generator will not suffer, but the voltage will fail on all the feeders, all synchronous motors will be thrown out of step, and an overwhelming overload will be thrown on the circuit-breaker of the short-circuited feeder, since it will carry the total current of all the generators in the station. If, however, protective reactances are placed in each feeder circuit, and a short circuit in a feed occurs, only that feeder will be affected and even then its reactance coil will prevent the current in it from rising to too high a value. The voltage will be maintained at the bus bars and no disturbances will be felt in the remaining feeders. This happens, of course, provided that the generators are self-protective; if not, such an event may seriously injure them.

THE DIESEL ENGINE.

"The Diesel Engine" is the subject of a book being distributed to interested parties by Busch-Sulzer Bros.-Diesel Engine Company of St. Louis. In its 112 beautifully illustrated and handsomely printed pages is a wealth of valuable information on the history and development of the Diesel engine, its efficiency and economy and theory and operation. Pictures and descriptions are given of typical installations throughout the country and of its adaptability to many industrial uses. The volume is concluded with a careful compilation of engineering data useful in making estimates for power installations. W. S. Heger, Rialto Building, San Francisco, is manager of the Pacific Coast Sales Department of the Busch-Sulzer Bros.-Diesel Engine Company.

FILTERING LUBRICATING OIL.

Some interesting statements as the result of experiments made by the Cornell University have been published by the Richardson Phenix Company, Lubrication Engineers & Manufacturers, Milwaukee, Wis. They may be summed up briefly as follows: If properly filtered, oil may apparently be used indefinitely without losing its lubricating properties. The fact that a power plant like that in the Hotel McAlpin, New York, pays for less than two tenths of one per cent of the amount of oil used and that oil can be purified in a commercial filter and returned to an oiling system in a state of purity equal to the new oil, is certainly of vast importance in the economical operation of power plants, and the old-fashioned idea of purchasing a barrel of oil and letting it drip to waste is certainly as out of date and uneconomical as Watts' original scheme of condensing the steam directly in the engine cylinder. The saving in the cost of the oil in the above plant by the use of the oiling system amounts to over two thousands dollars per month, but who can compute the amount of coal saved by the reduction of friction or how much wear and tear on the machinery is reduced. It is safe to say that the money value of these savings is at least as great as the reduction in the oil bill.

MAZDA LAMP PRICES REDUCED.

Below is given the new prices in effect April 1st, and constituting a further factor in the general and continued downward revision of the cost of electric light:

Price List.

Volts.	Watts.	New Price. Clear.	New Price. Frosted.	Old Price. Clear.	Old Price. Frosted.
	10	$0.30	$0.33	$0.35	$0.40
	15	.30	.33	.35	.40
	20	.30	.33	.35	.40
100	25	.30	.33	.35	.40
to	40	.30	.33	.35	.40
130	60	.40	.44	.45	.50
	100	.70	.77	.80	.90
	150	1.10	1.20	1.20	1.30
	250	1.80	1.95	2.00	2.15

It will prove of intense general interest that these prices are to be charged uniformly by all central stations and dealers in electrical supplies.

TRADE NOTES.

Westinghouse, Church, Kerr & Company, of Montreal and New York, have been retained by the Canadian Pacific Railway as engineers to investigate the matter of the proposed electrification of the new double track 5½ mile Selkirk tunnel in British Columbia. The investigations will cover in general the type of system to be installed, the relative economies of steam and water power and the effect of the electrification upon operating conditions.

The offices and display rooms of the San Francisco branch of the Welsbach Company, have recently been removed to more commodious quarters, 863 Mission street, between Fourth and Fifth.

The Foulkes-Gaylord Company, Los Angeles, Cal., has been awarded the electric wiring contract for the New Broadway department store of that city, amounting to $40,000.

The Pacific States Electric Company was awarded the contract to furnish 40 ornamental street lighting standards for Eagle Rock, Cal.

NEWS NOTES

INCORPORATIONS.

SAN DIEGO, CAL.—El Centro, Imperial & Calexico Electric Railway Company, $200,000, by L. R. Kirby and others.

SAN FRANCISCO, CAL.—Electrical Specialty Company, incorporated at $50,000, shares $1 each, subscribed $4, by D. David, A. C., W. A. and E. Gribble.

RED LODGE, MONT.—Carbon & Stillwater Electric Railway Company, has been incorporated for $750,000 for the purpose of building an interurban railroad between Red Lodge and Columbus, a distance of 40 miles.

ILLUMINATION.

AZUSA, CAL.—Bonds for an electric light system in the sum of $20,000 were voted here recently.

VENTURA, CAL.—The Pacific Gas & Electric Company has made application to the board of supervisors for a franchise to install and operate a gas and electric system in Ventura county.

HEMET, CAL.—The city trustees are considering plans for a better lighting system. It is estimated that a plant large enough to supply the city with sufficient lights will cost less than $3000.

ALBANY, ORE.—The Commercial Club has launched a campaign for a municipal electric light and power plant. A. M. Hammer is chairman, and G. T. Hockensmith and C. H. Stewart complete the committee.

PORTLAND, ORE.—The Portland Gas & Coke Company has renewed its application for a permit to construct a mammoth gas retainer at East Twelfth and Clinton streets. It is estimated that the structure will cost about $250,000.

CULDESAC, IDAHO.—W. L. Marrs of Coeur d'Alene has applied for a franchise to operate a light plant in Culdesac. Mr. Marrs was here some time ago looking over the plant of E. P. Atchison with a view to purchasing it and placing it in operation.

WALLOWA, ORE.—The committee appointed to look up data upon municipal ownership of an electric light plant made a report. W. G. Trill, acting spokesman, read communications from many cities stating that their municipal plants were paying propositions.

VENICE, CAL.—The city trustees will erect ornamental arches at the city limits on all boulevards leading into the city. At night these arches will be illuminated and will be discernable for many miles. The word "Venice" will be painted in large letters on the arches.

SEATTLE, WASH.—The monster 8 foot globe on the top of the 42 story L. C. Smith Building in Seattle, was lighted for the first time Saturday, March 21st, with four 750 and two 1000 watt nitrogen lamps. The lights were visible from all parts of the city and far out on Puget Sound.

SALT LAKE CITY, UTAH.—Upon the invitation of the Home Economic Section of the Ladies' Literary Club, the Utah Light & Railway Company gave a practical demonstration of the operation of electric cooking and heating appliances before this section at the club's new home on East South Temple.

PHOENIX, ARIZ.—The Southside Gas & Electric Company has purchased the present electric light equipment from the Chandler Improvement Company, and the new company will be ready to serve practically all of Chandler within 60 days. F. L. Chandler, president of the company, states that gas will be piped from the mesa plant to Chandler soon.

LOS ANGELES, CAL.—Plans for the 1915 electrical display in the streets of the city call for an appropriation of $50,000, minimum, and $100,000, maximum. It is the idea of the committee to get away from the usual stringing of lights from one side of the street to the other, as has been done for many years. Something new is sought, one thing practically decided being a number of huge towers.

SALT LAKE CITY, UTAH.—The proposal made by the Utah Light & Railway Company to the commissioners of this city to furnish a blanket bond for electric signs to save the city harmless in case damages result from the signs falling or otherwise, has been rejected by the commission. They have decided instead to take out liability insurance on electric signs and charge the cost of the insurance against the sign owners. The commission reached this decision after carefully investigating the matter and concluded that the liability insurance would afford better protection at lower cost than the blanket bond.

TRANSMISSION.

SANDY, ORE.—The Portland Railway, Light & Power Company has agreed to furnish electrical energy if the city will build the necessary pole line from Bull Run.

NEW WESTMINSTER, B. C.—The city council has authorized extensions to the present street lighting system and additions to the city electrical equipment. This municipality operates its own street lighting and distribution systems.

VANCOUVER, B. C.—The Western Canada Power Company is arranging for a considerable amount of work in connection with its generating plant at Stave Falls as well as its distribution service. In July a 13,000 h.p. turbine from Switzerland is to be delivered.

LAS VEGAS, NEV.—Henry C. Schmidt and Clement H. Mace have filed a permit from the government for developing electric power amounting to 40,000 h.p. in Colorado River. Mr. Schmidt expects to be in Las Vegas in the near future to make preliminary arrangements for the work.

LA GRANDE, ORE.—A. Klees & Son, owners of the electric plant at Summerville, have reorganized as Klees Water Power Company, and have prepared plans and completed preliminary work for the erection of a larger central station, distributing system and auxiliary steam power plant.

SALEM, ORE.—The Rogue River Public Service has completed its filing on the water of Rogue River, at Hell's Gate for the development of 44,320 h.p. A 200 ft. dam is to be constructed. The power is to be used for pumping water for irrigation and for electric railroads and other commercial purposes.

VICTORIA, B. C.—Further additions to the Jordan River plant of the Vancouver Island Power Company will be commenced within a short time to provide for the third unit. This will bring the aggregate capacity of the plant to 25,000 h.p. The machinery is already on the ground and as soon as the building, which will cost $75,000, is complete the plant can be installed.

SAN FRANCISCO, CAL.—C. O. Poole, an engineer for the Southern Sierras Power Company, a subsidiary of the Nevada-California Power Company, has made three preliminary applications to the State Water Commission for water power permits on Baker Creek in Inyo county. The three projects contemplated are for the appropriation of 300 sec. ft. each and it is estimated that they will cost $400,000, $550,000 and $400,000 respectively.

OLYMPIA, WASH.—In a decision reversing the opinion of the superior court of Skagit county, the supreme court at Olympia has dismissed certain condemnation suits instituted by the Western Washington Power Company against land owners along the Baker River and tributaries. The court held that the testimony did not show sufficient cause for the exercise of the power to condemn private lands

for public purposes. As a result of the decision the plan to erect a big hydroelectric power plant in Skagit county will be temporarily halted. Attorneys for the Western Washington Power Company will prepare a motion for a rehearing of the case by the supreme court at Olympia.

TRANSPORTATION.

PASADENA, CAL.—Paul Shoup, president of the Pacific Electric Company, stated before the city commissioners that his company has under consideration the feasibility of electrifying the branch line of the Salt Lake line between Pasadena and Los Angeles, in an effort to improve car service

TACOMA, WASH.—The agreement reached by the city with the Tacoma Railway & Power Company for the operation of the tide flats car line has been signed by General Manager L. H. Bean for the company and Mayor Seymour for the city. The next step will be for the disposal of the $35,000 issue of bonds for the construction of the line.

WOODLAND, CAL.—H. R. Timm, treasurer of the Sacramento Valley Electric Railroad, has been informed that the contract for building the first unit of the road has been awarded to the Hughes Construction Company. The unit extends from the junction with the Oakland, Antioch & Eastern Railroad to this city, a distance of 11 miles. The next unit to be built will be from Dixon to Woodland.

PORTLAND, ORE.—Immediate completion of the Willamette Valley Southern Railway from Oregon City via Beaver Creek, Mulino and Molalla to Mount Angel and the actual operation of the road before the end of the present year was assured a few days ago when the Portland Railway, Light & Power Company agreed to guarantee a $700,000 bond issue necessary to finance the project.

POCATELLO, IDAHO.—J. D. Browning, representing an Eastern syndicate, states that work is to be commenced with as little delay as possible on construction of the street railway in Pocatello, the city council having granted the franchise. The system provides lines for the principal streets and use of a viaduct now in existence and owing to terms imposed by the public utilities commission there can be no delay or stock speculation in the project.

PASADENA, CAL.—At a special meeting of the Pasadena Realty Board, City Commissioners Metcalf and Salisbury asked the board to unite with other civic organizations of Pasadena in appointing a joint committee to consider plans for a municipal electric railway between Pasadena and Los Angeles, that have been drawn by D. J. MacPherson, There were references to a possible issue of $2,000,000 in bonds by the city. The realty board will co-operate with the city commissioners.

GLOBE, ARIZ.—Globe and Miami will be connected with an electric interurban line before the end of the coming summer, according to predictions made by D. O. De Tar, who has been working quietly on a project for several months. The line is to be built by local capital. A franchise for the use of streets here has been asked and will be voted upon at the coming city election. No stock in the company will be sold until the franchise is granted or until $75,000 worth of shares and $100,000 bonds are pledged.

OGDEN, UTAH.—Construction work on those sections of the proposed route of the extension of the Ogden Rapid Transit Company's interurban line north from Bingham City, Utah, to Preston, Idaho, where rights have been obtained, will begin within the next two weeks, according to P. D. Kline, general manager of the company. He is stated to have said that right of way had been obtained for the roadbed between Logan and Wellsville and between Logan and Richmond. The company has decided not to use the Ogden canyon route. The route that has practically been settled upon, Mr. Kline said, would parallel the Oregon Short Line tracks for the greater part of the distance. The difficulties in getting rights of way have been encountered between Wellsville and Brigham City, he said, but agents of the company are now working along that part of the proposed route. Rapid Transit officials say they expect to complete the entire extension within two years.

SAN FRANCISCO, CAL.—The city engineer has reported that the proposed construction of an extension on Stockton street from Columbus avenue to the Embarcadero, for the purpose of affording railway service to the passenger piers which the harbor commission is about to build on the northern waterfront would cost $68,000 and would involve going over a grade of more than 12 per cent between Chestnut and Francisco streets, and that this grade was too steep for the safe operation of ordinary street cars equipped with air brakes.

BURNS, ORE.—A meeting was held in Drewsey recently for the purpose of promoting an electric railway from Riverside up the Malheur Pass Drewsey, to tap the timber belt near Logan Valley. A permanent organization was formed with the following officers elected: J. L. Sitz, president; I. M. Davis, vice-president; W. D. Baker, secretary; C. W. Drinkwater, treasurer. A committee of finance was formed consisting of J. Edwin Johnson, E. B. Dunton, and John Ott. Steps will now be taken to interest capital in the building of this road. The organization will be known as the Malheur Valley Electric Railway Company.

SALT LAKE CITY.—The county commissioners of Salt Lake county have granted a franchise to the Utah Light & Railway Company for two important extensions of their interurban system which the company officials state will be built during the present year. One of these extensions will be from the terminus of the present Holliday interurban line to the company's power station located in Big Cottonwood Canyon. This canyon is one of the most picturesque of the Wasatch Range, and it is expected that much tourist and summer resident travel will be developed. The other extension will be from the terminus of the company's Wandamere line south to Fourteenth South and thence west approximately one mile to connect with the present Murray, Sandy and Midvale interurban line.

TELEPHONE AND TELEGRAPH.

NEWPORT BEACH, CAL.—The board of trustees will receive bids up to May 4th for a certain franchise granting the right to construct and maintain a telephone and telegraph system here.

SAN DIEGO, CAL.—An application for a franchise has been filed by the Pacific Telephone & Telegraph Company. The company proposes to allow the city the use of its poles and conduits for wires for police and fire alarm systems.

PORTLAND, ORE.—The socalled telephone trust, by which the Bell system dominates the lines of Washington, Oregon and Idaho, was dissolved without a fight here when a decree accepted by the telephone interests and conceding the government's demand was entered in the Federal court. The decree adds another state in the peaceful reorganization and makes specific plans for the restoration of competitive conditions in the Pacific Northwest. It ends the suit under the Sherman anti-trust law, brought here last July by the attorney general. In compliance with its terms the Bell Company will give up its holdings in the Northwestern Telephone Company, with lines from Port Angeles, Wash., to Corvallis, Ore., and in the Interstate Telephone Company, with lines from Spokane, Wash., into Northern Idaho. The acquisition of these two long distance companies, the purchase of the Home Telephone Company of Spokane, and of exchanges competing with the Bell in Seattle, Tacoma and Bellingham, Wash., contributed to the alleged combination in restraint of trade which led to the suit.